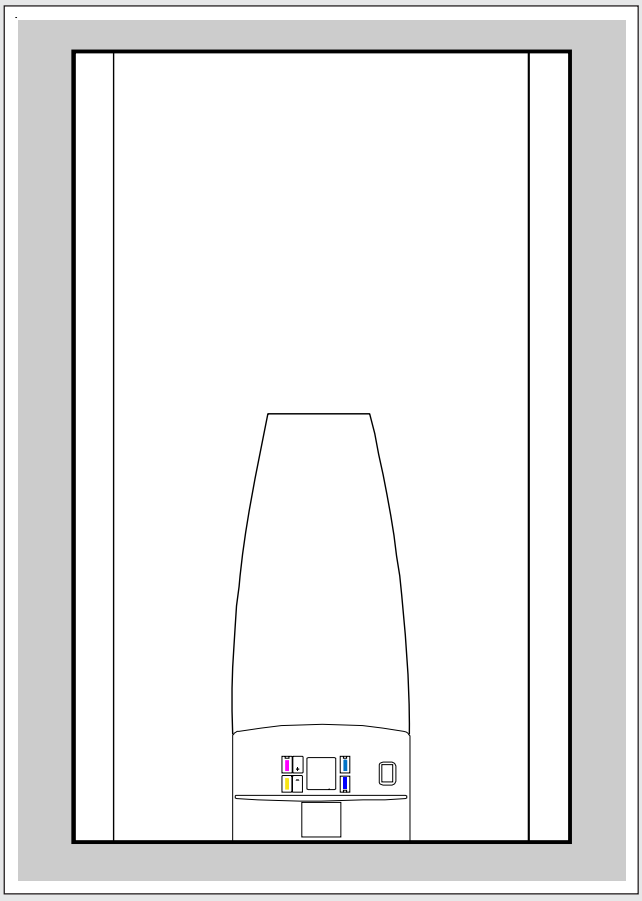
Unical®

ALKON 50 kW
ALKON 70 kW



INSTALLATION AND SERVICING MANUAL

ENGLISH

00333009/a - 3rd edition - 02/10

Warning: this manual contains instructions to be used exclusively by the installer and/or a competent person in accordance with the current laws in force.
The end user MUST not make any alterations to the boiler.
Failure to follow the instructions indicated in this manual, which is supplied with the boiler, could cause injury to persons, animals or damage to property. UNICAL shall not be held liable for any injury and/or damage.

CONTENTS

1 GENERAL INFORMATION 3
1.1 Symbols used in this guide 3
1.2 Correct use of the appliance 3
1.3 Water treatment 3
1.4 IInformation to be passed over to the person in charge of the appliance 3
1.5 Safety warnings 4
1.6 Data badge 5
1.7 General warnings 6

2 TECHNICAL FEATURES AND DIMENSIONS 7
2.1 Technical features 7
2.2 Dimensions 8
2.3 Main components 11
2.4 Boiler water circuit 12
2.5 Operating performances 13
2.6 General features 13

3 INSTRUCTIONS FOR THE INSTALLER 14
3.1 General warnings 14
3.2 Installation standards 15
3.3 Packaging 16
3.4 Boiler location in a boiler room 16
3.5 Installation on existing systems 17
3.6 Gas connection 17
3.7 Connection return and flow system pipes 18
3.8 Determination of primary boiler pump or boiler pump system 19
3.9 Supplemental safety, security and control devices 20
3.10 Safety pressure relief valve 21
3.11 Working pressure 21
3.12 Mixing header filter 22
3.13 Mixing header 22
3.14 Condensing drain 23
3.15 Water treatment 24
3.16 Fluing connections 25
3.17 Electrical connections 30
General warnings 30
Connection to electrical supply 230V 30
Room thermostat and/or heating controller E8 connection 31
Electrical connection of additional safety devices 31
Electrical connection of additional safety devices for ALKON 50/70 in batterie 32
3.18 Practical connection diagrams 33
3.19 Management connections diagram with E8 regulator 36
3.20 Examples of installation (functional diagram) 38
3.21 Examples of installations with optional kits 44
3.22 Filling the system 48
3.23 COMMISSIONING 48
Preliminary checks 49
Ignition and switching off 49
Information to be supplied to the user 49
3.24 Burner adjustment 50
3.25 Burner pressure adjustment 52
3.26 Gas conversions 52
3.27 Programming of the operational parameters 53

4 SERVICING SCHEDULE 55
Instructions for checking and servicing the appliance 55
Table of the resistance values in function of the heating and domestic sensor temperature 55
Verification and cleaning of the condensate evacuation siphon 55
Sealing gasket between distributor and boiler body 56

5 FAULT FINDING 57
5.1 Error codes 57
5.2 Servicing Request 57
5.3 Display off error codes on heating controller E8 59

6 DECLARATION OF CONFORMITY 62

7 CE CERTIFICATE 63

1 GENERAL INFORMATION

1.1 - SYMBOLS USED IN THIS GUIDE

When reading this guide particular care has to be given to the parts marked with the followings symbols:

DANGER!
Indicates serious danger for your personal safety and for your life

WARNING!
Indicates a potentially dangerous situation for the product and the environment

NOTE!
Suggestions for the user

1.2 - CORRECT USE OF THE APPLIANCE

The ALKON appliance has been designed utilizing today's heating technology and in compliance with the current safety regulations.However, following an improper use, dangers could arise for the safety and life of the user or of other people, or damage could be caused to the appliance or other objects.The appliance is designed to be used in pumped hot water central heating systems. Any other use of this appliance will be considered improper.UNICAL declines any responsibility for any damages or injuries caused by an improper use; in this case the risk is completely at the user's responsibility.In order to use the appliance according to the scopes it was designed for it is essential to carefully follow the instructions indicated in this guide.

1.3 - WATER TREATMENT

- The hardness of the mains water supply conditions the frequency with which the heat exchanger is cleaned.
- In hard water areas where the main water can exceed 15°f total hardness, a scale reducing device is recommended. The choice of this device has to be made taking into consideration the characteristics of the water.
- In order to improve the resistance to lime scale it is recommended to adjust the domestic hot water temperature as near as possible to the one you really require.
- We recommend you to check the state of cleanliness of the domestic hot water heat exchanger at the end of the first year and subsequently, on the basis of the lime scale found, this period can be extended to two years.

1.4 - INFORMATION TO BE HANDED OVER TO THE USER

The user has to be instructed on the use and operation of his heating system, in particular:

- Hand over these instructions to the end user, together with any other literature regarding this appliance, placed inside the envelope contained in the packaging. **The user has to keep these documents in a safe place in order to always have them at hand for future reference.**
- Inform the user on the importance of air vents and of the flue outlet system, stressing the fact that is absolutely forbidden to make any alterations to the boiler.
- Inform the user how to check the system's water pressure as well as informing him how to restore the correct pressure.
- Explain the function of time and temperature controls, thermostats, heating controls and radiators, to ensure the greatest possible fuel economy.
- Remind the user that it is obligatory to carry out a comprehensive service annually and a combustion analysis every two years (in compliance with the national law).
- If the appliance is sold or transferred to another owner or if the present user moves home and leaves the appliance installed, ensure yourself that the manual always follows the appliance so that it can be consulted by the new owner and/or installer.

Failure to follow the instructions indicated in this guide, which is supplied with the boiler, could cause injury to persons, animals or damage to property. The manufacturer shall not be held liable for any such injury and/ or damage.

5 - SAFETY WARNINGS

WARNING!
The installation, adjustment, and servicing of this appliance must be carried out by a competent person and installed in accordance with the current standards and regulations. Failure to correctly install this appliance could cause injury to persons, animals or damage to property. The manufacturer shall not be held liable for any injury and/or damage.

DANGER!
Servicing or repairs of the appliance must be carried out by UNICAL authorised service technicians; UNICAL recommends drawing up a service contract. Bad or irregular servicing could compromise the safe operation of the appliance, and could cause injury to persons, animals or damage to property for which UNICAL shall not be held liable.

Modifications to parts connected to the appliance
Do not carry out any modifications to the following parts:
- the boiler
- to the gas, air, water supply pipes and electrical current
- to the flue pipe, safety relief valve and its drainage pipe
- to the constructive components which influence the appliance's safe operation

WARNING!
When tightening or loosening the screw pipe connections, use only adequate fork spanners.
The improper use and/or the use of inadequate equipment can cause damages (for example water or gas leakages).

WARNING!
Indications for appliances operating with propane gas
Ensure yourself that before installing the appliance the gas tank has been purged.
For a correct purging of the tank contact the liquid gas supplier or a competent person who has been legally authorized.
If the tank has not been correctly purged problems could occur during ignition.
If this occurs contact the liquid gas tank's supplier.

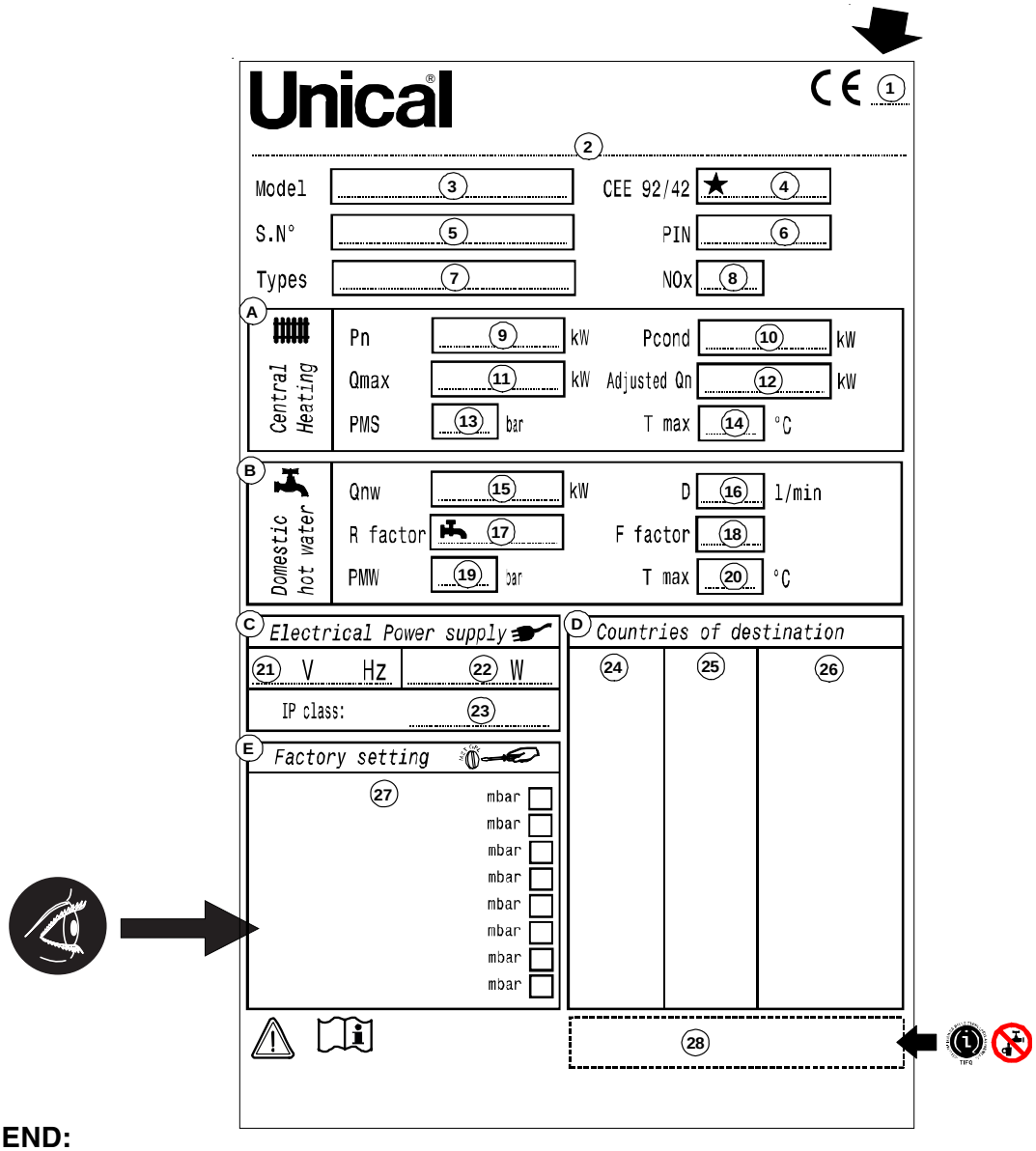
Smell of gas
If you smell gas follow these safety indications:
- Do not turn on or off electrical switches
- Do no smoke
- Do not use the telephone
- Close the main gas tap
- Open all windows and doors where the gas leakage has occurred
- Inform the gas society or a company specialized in installing and servicing heating systems

Explosive and easily inflammable substances
Do not use or leave explosive or easily inflammable material (as for example: petrol, paint, paper) in the room where the appliance has been installed.

1.6 DATA BADGE

CE Marking

- The CE marking documents that the boilers satisfy:
- The essential requirements of the Directive regarding gas appliances (Directive 90/396/CEE)
- The essential requirements of the ElectroMagnetic CompatibilityDirective (2004/108/CEE)
- The essential requirements of the BoilersEfficiency Directive (92/42/CEE)
- The essential requirements of the Low Voltage Directive (2006/95/CEE)



LEGEND:

1 = CE Surveillance notify body
2 = Boiler type
3 = Boiler model
4 = Number of stars (Directive 92/42/CEE)
5 = (S.N°) Serial number
6 = P.I.N. code
7 = Approved fluing configurations
8 = (N0x) N0x class

A = Central Heating circuit features
9 = (Pn) Nominal output
10 = (Pcond) Condensing nominal output
11 = (Qmax) Nominal heat input
12 = (Adjusted Qn) Adjusted for nominal Heat input
13 = (PMS) Max. pressure C.H. system
14 = (T max) Max. C.H. temperature

B = Domestic Hot Water circuit features
15 = (Qnw) Nominal heat input in D.H.W. mode (if different from Qn)
16 = (D) Specific D.H.W. flow rate according to EN 625 - EN 13203-1
17 = (R factor) N° taps based on the quantity of water declared EN 13203-1
18 = (F factor) N°stars based on the quality of water declared EN 13203-1
19 = (PMW) Max. pressure D.H.W. system
20 = (T max) Max. temperature D.H.W system

C = Electrical features
21 = Electrical power supply
22 = Consumption
23 = Protection grade

D = Countries of destination
24 = Direct and indirect country of destination
25 = Gas family
26 = Supply pressure

E = Factory setting
27 = Adjusted for gas type X
28 = Space for national brands

1.7 - GENERAL WARNINGS

This instruction manual is an integral and indispensable part of the product and must be retained by the person in charge of the appliance.

Please read carefully the instructions contained in this manual as they provide important indications regarding the safe installation, use and servicing of this appliance.

Keep this manual in a safe place for future reference.

The installation and servicing must be carried out in accordance with the regulations in force according to the manufacturer's instructions and by legally competent authorized persons.
The installations for the domestic hot water production MUST be build, in their entirety, with materials (taps, pipes, fittings, etc.) approved for drinkable water.

By a competent person, we imply a person who has a specific technical qualification in the field of components for central heating systems for domestic use, domestic hot water production and servicing. The person must have the qualifications foreseen by the current laws in force.

Bad or irregular servicing could compromise the safe operation of the appliance, and could cause injury to persons, animals or damage to property. The manufacturer shall not be held liable for any such injury and/or damage.

Before carrying out any cleaning or servicing turn off the electrical supply to the boiler by means of the ON/OFF switch and/or by means of the appropriate shutdown devices.

Do not obstruct the intake/outlet terminal ducts.

In the event of failure and/or faulty functioning of the appliance, switch off the boiler. Do not attempt to make any repairs: contact qualified technicians.

Any repairs must be carried out by Unical authorized technicians and using only original spare parts. Non-observance of the above requirement may jeopardize the safety of the appliance.

To guarantee the efficiency and correct functioning of the appliance it is indispensable to have the boiler serviced annually by a qualified person.

If the boiler remains unused for long periods, ensure that any dangerous parts are rendered innocuous.
Before putting again into service an appliance which has been unused for a certain time, proceed to rinse the domestic hot water circuit, making the water flowing for the time necessary to draw the full content of the domestic circuit.

If the appliance is sold or transferred to another owner or if the present user moves home and leaves the appliance installed, ensure yourself that the manual always follows the appliance so that it can be consulted by the new owner and/or installer.

Only original accessories must be used for all appliances supplied with optionals or kits (including electrical ones).
This appliance must be used only for the purposes for which it has been expressively designed. Any other use shall be considered incorrect and therefore dangerous.

2 TECHNICAL FEATURES AND DIMENSIONS

2.1 - TECHNICAL FEATURES

The **ALKON 50/70** boilers are a thermals gas fired units with an atmospheric fully pre-mixed burner.
They are supplied only in heating version.

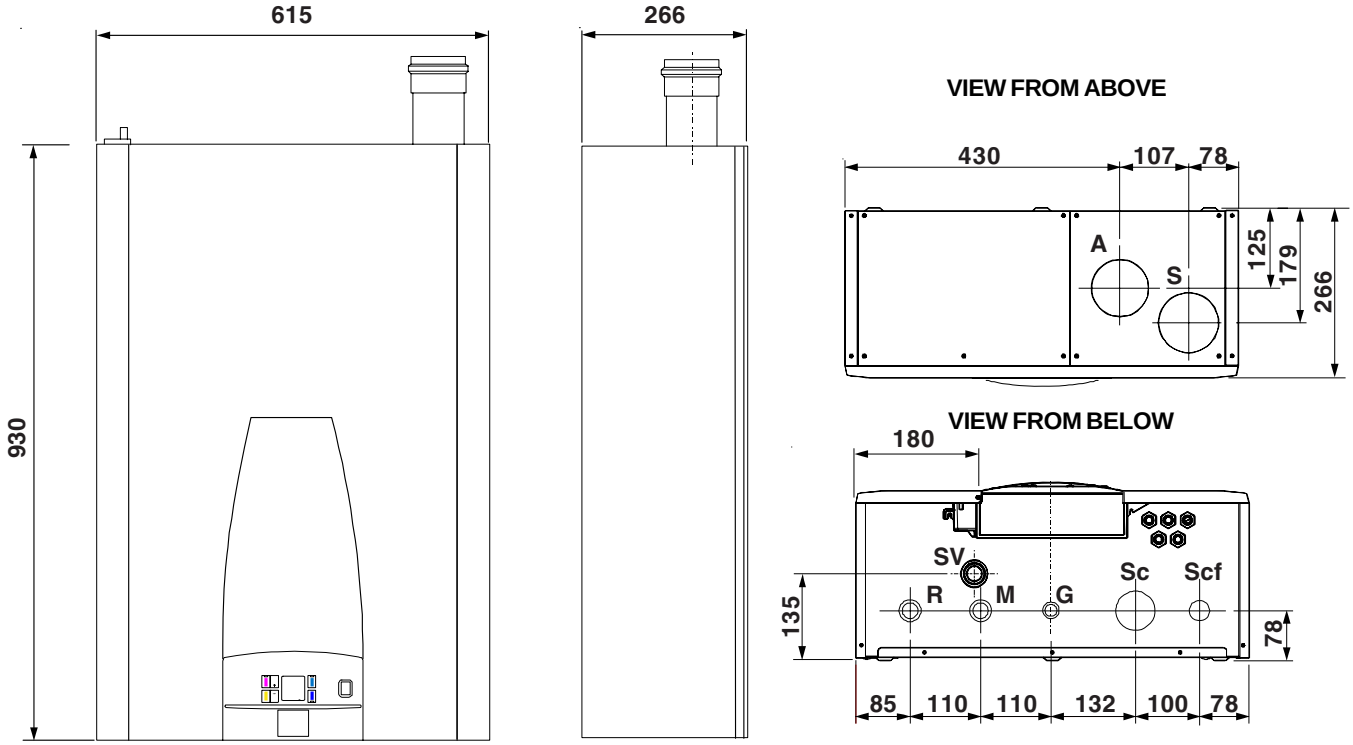
These boilers have an input head power of: 50 or 70 kW,
These boilers are designed for use on gas category II_{2H3P}.
The ALKON boilers are supplied complete with all the safety and control devices in accordance with all the current regulations and the following European directives:
– Gas Directive 90/396 CEE
– Efficiency Directive 92/42 CEE
– Electromagnetic Compatibility Directive 2004/108 CEE
– Low Voltage Directive 2006/95 CEE.

Moreover, the boilers of the **ALKON** range are classified as "CONDENSING BOILERS" according to the Directive 92/42 CEE appendix 2 (4 stars).

DESCRIPTION OF COMPONENTS AND FEATURES:
- Aluminium heat exchanger/condenser;
- Fully premixed burner working at constant CO2;
- Electronic ignition;
- Safety high limit thermostat;
- Flow temperature sensor;
- Return temperature sensor;
- Automatic air vent;
- Drain condensate siphon
- Control panel with electrical protection IP X4D;
- eBUS device;
- CH temperature selector switch: 30 ÷ 85°C;
- Flame modulation in function of the absorbed power;
- Pump overrun function;
- Additional functions : diagnostics of operation parameters and troubles, antifreeze, technical functions and digital indication of failures.
- Constant combustion ratio
- Self adapting output depending on the length of flue ducts
- Modulating pump for ALKON 70

OPTIONAL KITS:
- Kit of manidold for additional safety devices
- Kit of additional safety devices
- Krömschröder controller E8/Expansion modules and modulating thermostats (case for wall mounting)
- Kit of boiler pump (at constant or modulating flow rate: only for ALKON 50)
- Mixing bottle Kit
- Chimney for single, battery or cascade mounting
- Supporting frames
- Kit for D.H.W. priority
- Kit of blind flanges and hydraulic manifolds
- Kit of wiring harness for external D.H.W. tank

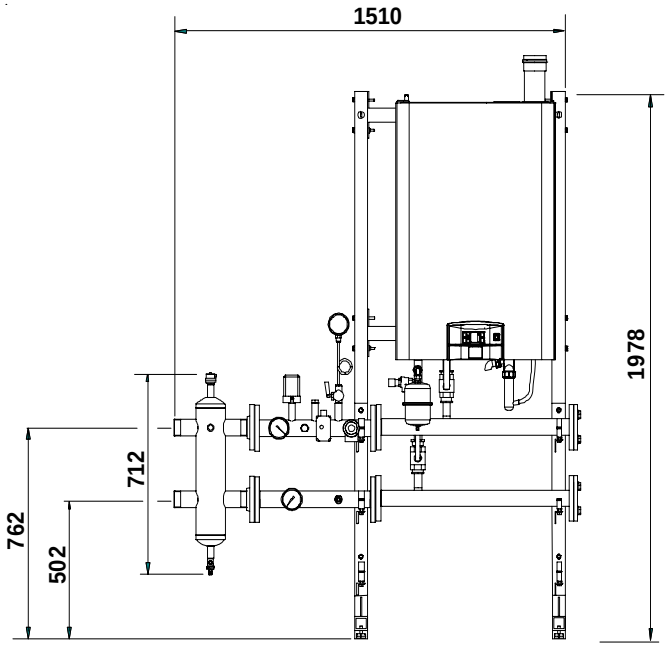
2.2 - DIMENSIONS



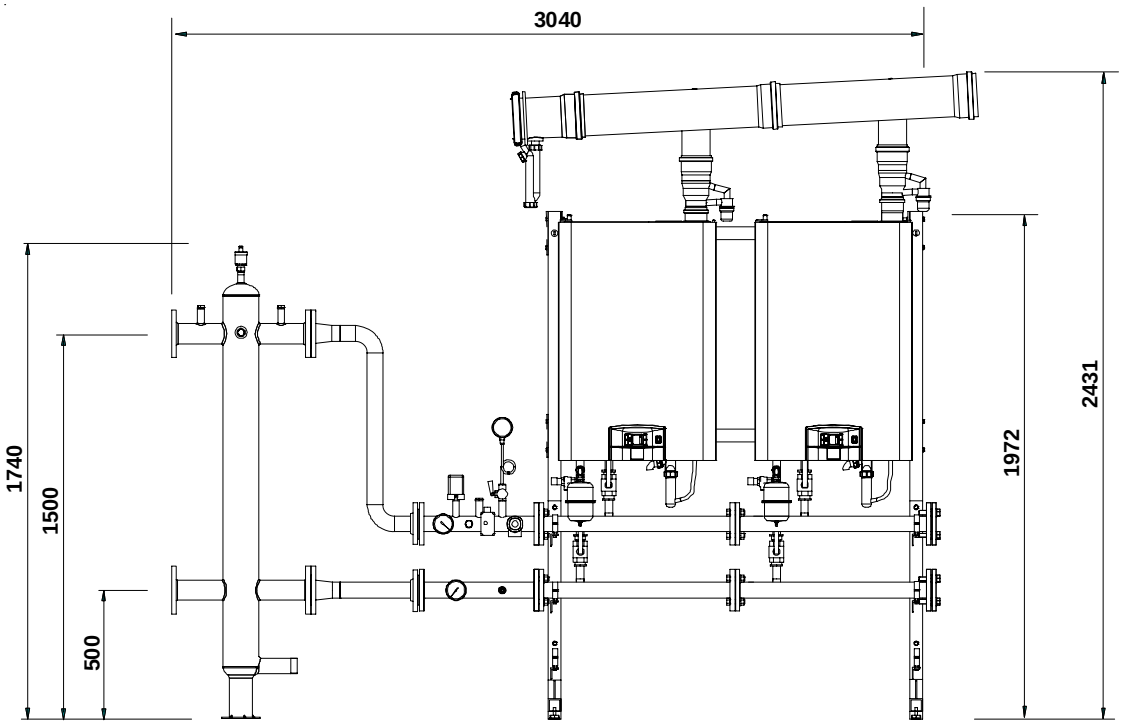
R CH system return 1'' (1 ¼'' for 70 kW)
M CH flow system 1'' (1 ¼'' for 70 kW)
G Gas Inlet Ø ¾''
Sc Outlet condensate drain siphon (corpo alluminio)
Scf Outlet condensate drain siphon (proveniente dal tubo scarico fumi)
SV Safety valve outlet
A Air intake
S Flue Outlet

Technical features and dimensions

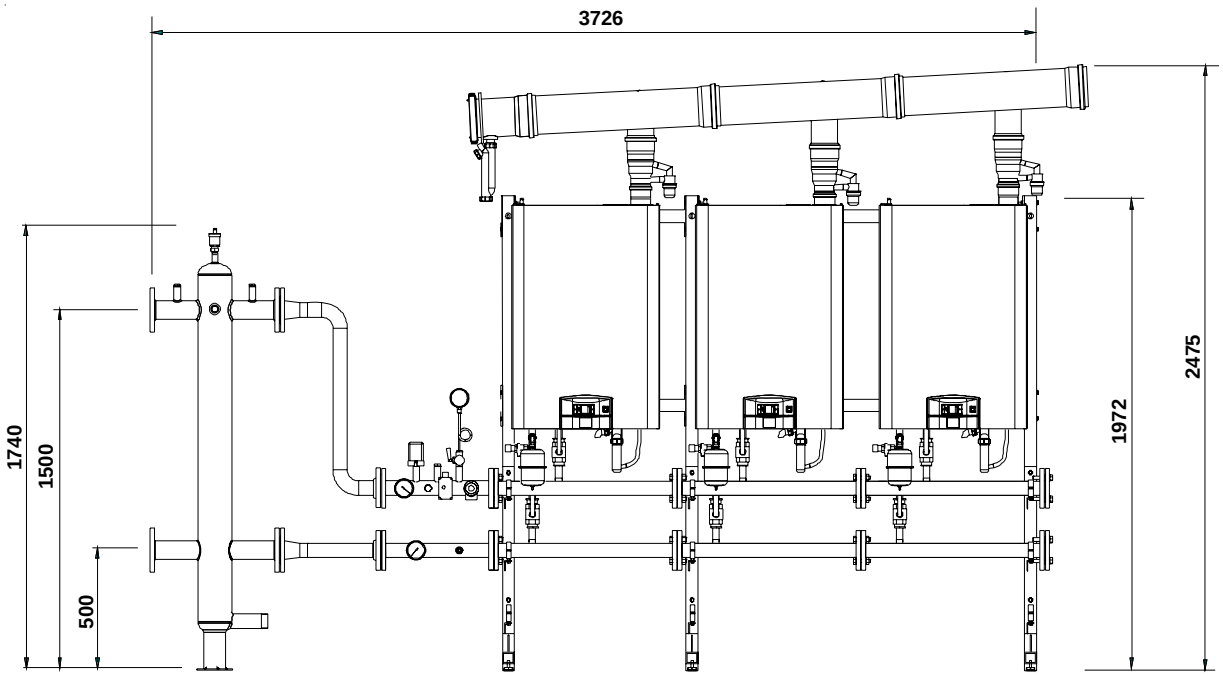
DIMENSIONS ALKON 50/70 + KIT SAFETY DEVICES + HYDRAULIC HEADER +Y FILTER KIT



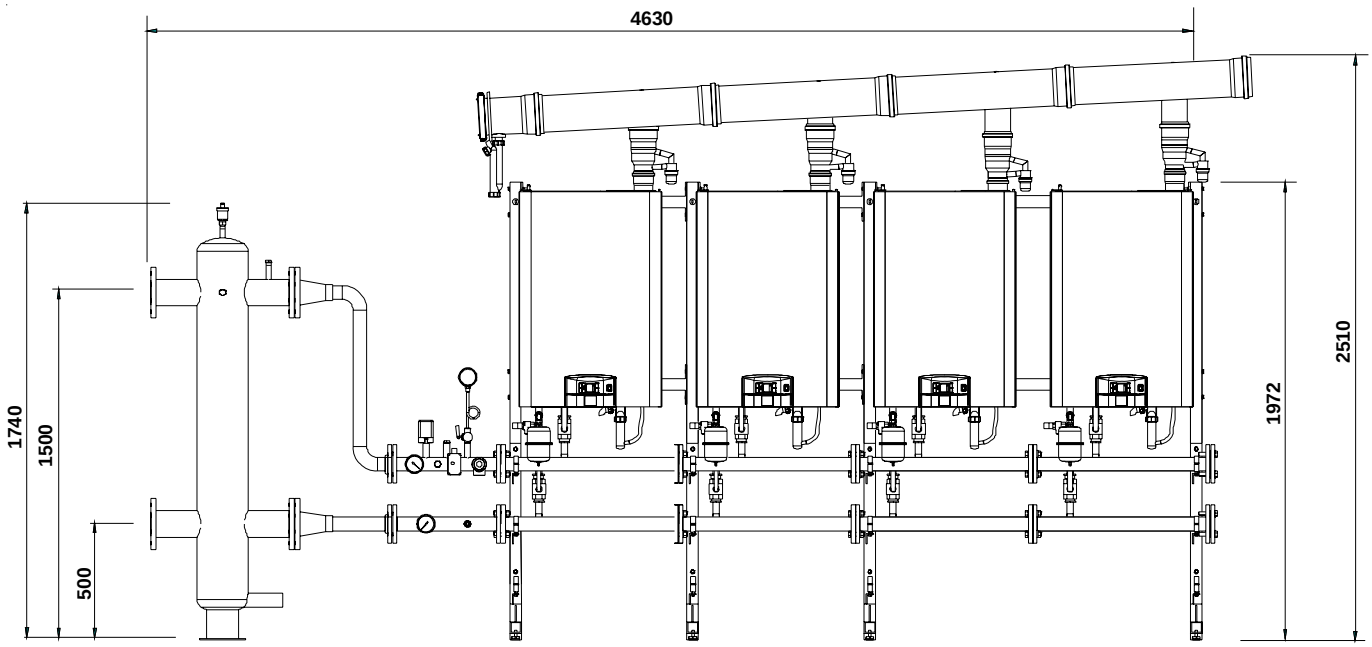
DIMENSIONS ALKON 50/70 in BATTERY (n.2 boilers) + KIT SAFETY DEVICES + HYDRAULIC HEADER +Y FILTER KIT



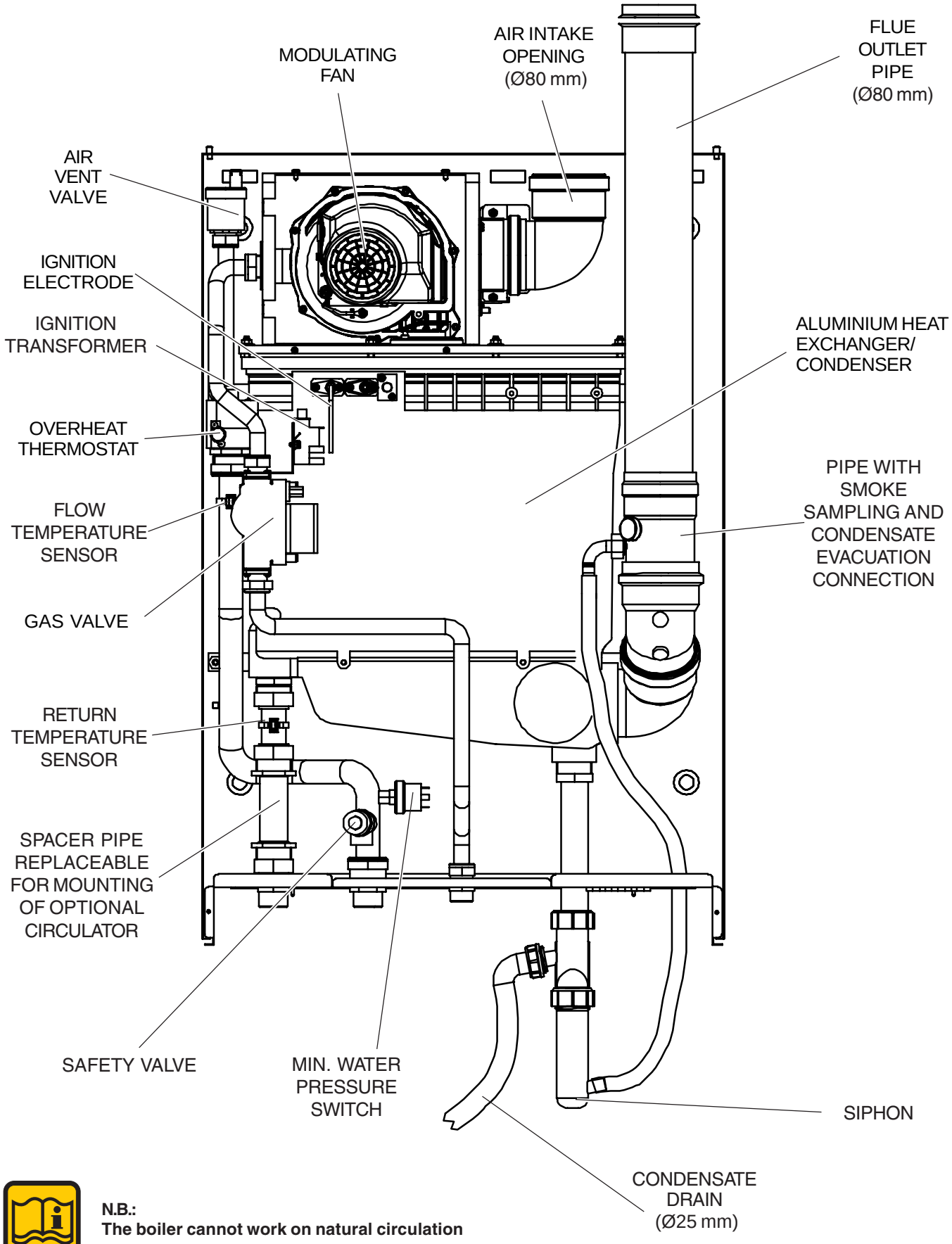
DIMENSIONS ALKON 50/70 in BATTERY (n.3 boilers) + KIT SAFETY DEVICES + HYDRAULIC HEADER +Y FILTER KIT



DIMENSIONS ALKON 50/70 in BATTERY (n.4 boilers) + KIT SAFETY DEVICES + HYDRAULIC HEADER +Y FILTER KIT

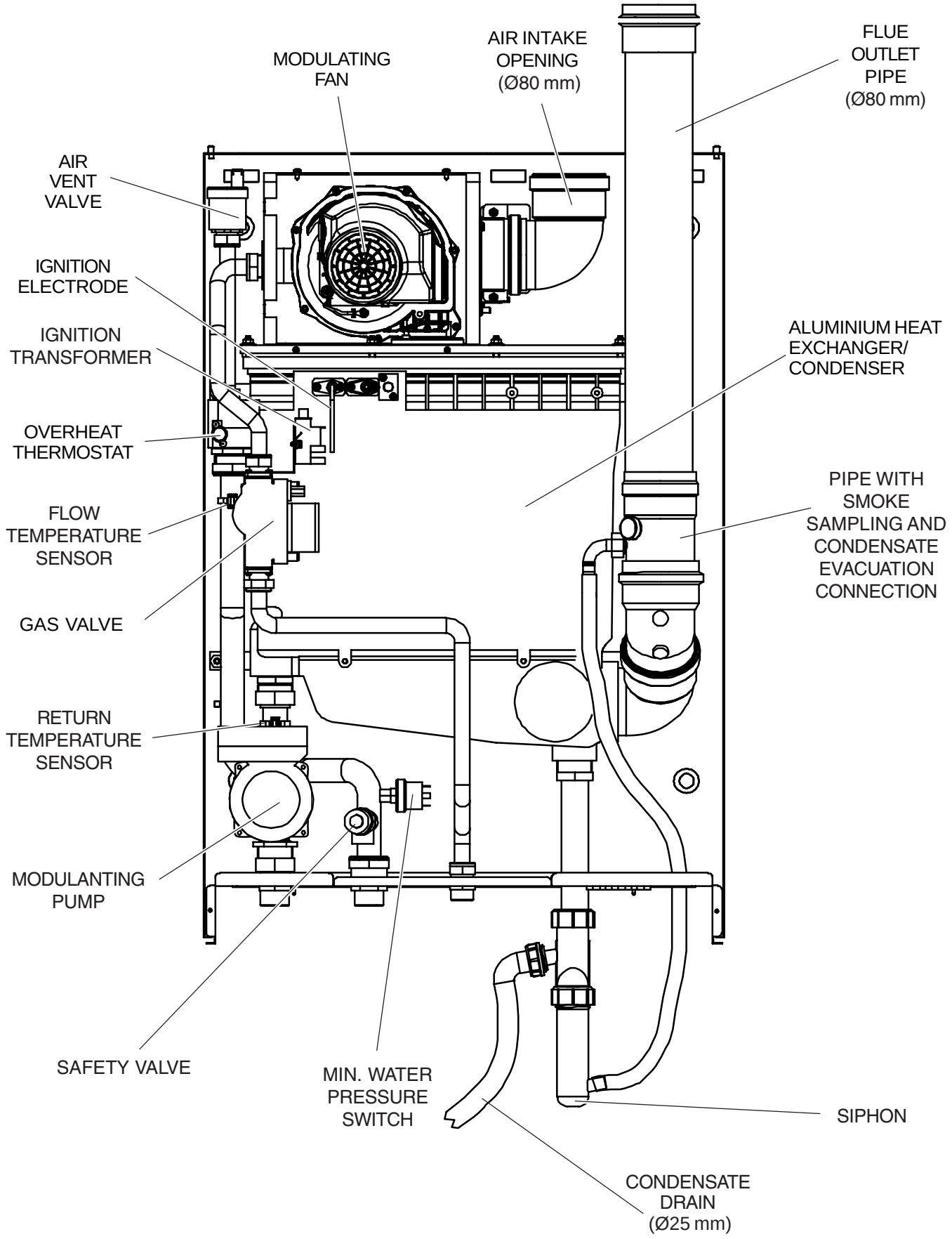


2.3 - MAIN COMPONENTS
ALKON 50

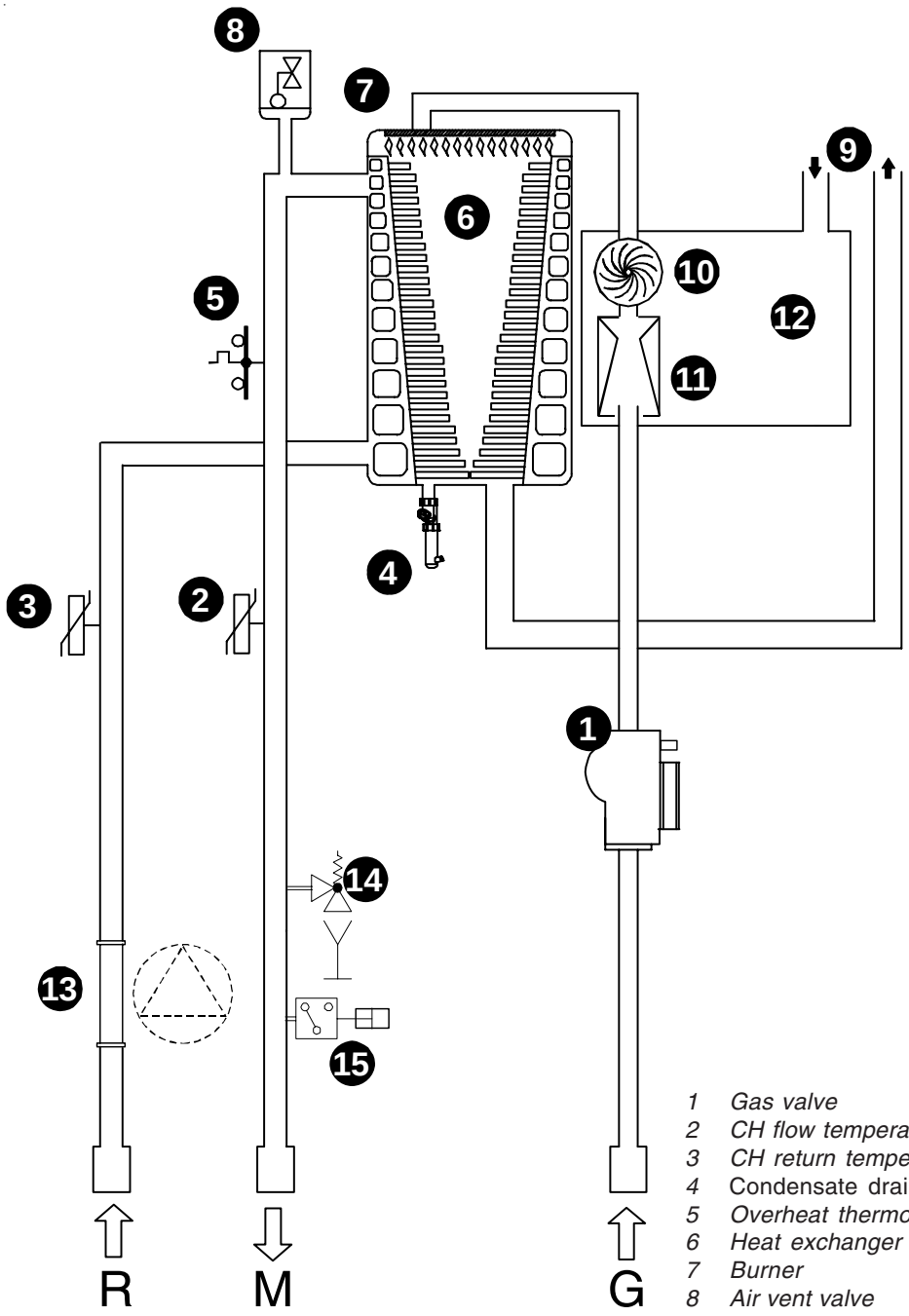


N.B.:
The boiler cannot work on natural circulation

ALKON 70


MODULATING FAN
AIR INTAKE OPENING (Ø80 mm)
FLUE OUTLET PIPE (Ø80 mm)
AIR VENT VALVE
IGNITION ELECTRODE
IGNITION TRANSFORMER
OVERHEAT THERMOSTAT
FLOW TEMPERATURE SENSOR
GAS VALVE
RETURN TEMPERATURE SENSOR
MODULANTING PUMP
SAFETY VALVE
MIN. WATER PRESSURE SWITCH
ALUMINIUM HEAT EXCHANGER/ CONDENSER
PIPE WITH SMOKE SAMPLING AND CONDENSATE EVACUATION CONNECTION
SIPHON
CONDENSATE DRAIN (Ø25 mm)

2.4 - BOILER WATER CIRCUIT DIAGRAM



1 Gas valve
2 CH flow temperature sensor
3 CH return temperature sensor
4 Condensate drain siphon
5 Overheat thermostat
6 Heat exchanger
7 Burner
8 Air vent valve
9 Flue outlet / Air intake
10 Fan
11 Premix
12 Room sealed chamber
13 Replaceable pipe for insertion optional pump (only for ALKON 50) modulating pump only for ALKON 70
14 Safety valve 6 bar
15 Pressure switch against lack of water

M C.H flow
G Gas supply
R C.H. return

ATTENTION!
THE PRE-FORMING FOR THE BOILER PUMP IS ONLY FOR THE PUMP KIT SUPPLIED BY UNICAL

00361320 - Kit of MODULATING PUMP, only for ALKON 50

00361321 - Kit of CONSTANT FLOW RATE PUMP, only for ALKON 50

2.5 - PERFORMANCE DATA

For information regarding the adjustment of: INJECTORS - BURNER PRESSURES – DIAPHRAGMS – OUTPUTS – GAS CONSUMPTIONS please refer to the paragraph ADAPTMENT TO THE USE OF OTHER GASES.

		ALKON 50	ALKON 70
Max heat input	kW	48,5	67,5
Min heat input	kW	9,6	9,6
Nominal heat outpout 80/60	kW	47,2	65,5
Minimum heat output 80/60	kW	9,1	9,1
Efficiency at nominal load 80/60	%	97,29	97,06
Efficiency at minimal load 80/60	%	94,9	94,9
Number of stars (according to CEE 92/42	n.	4	4
Nominal heat output in condensing mode 50/30	kW	49,3	68,5
Minimal heat output in condensing mode 50/30	kW	10,3	10,3
Efficiency at nominal load in condensing mode 50/30	%	101,62	101,51
Efficiency at minimal load in condensing mode 50/30	%	107,33	107,33
Combustion efficiency at nominal load	%	97,80	98,39
Combustion efficiency at minimal load	%	98,42	98,28
Stand-by losses with burner in operation	%	0,58	0,35
Stand-by losses with burner off	%	0,311	0,223
(*) Flue gas temperature tf-ta (max)	°C	43,6	51,3
Flue gas mass flow rate (max)	g/s	21,44	30,96
Air excess λ	%	26,84	26,84
Condensate production max	kg/h	7,8	10,87
(**) CO_2 (min - max)	%	-	-
CO at 0% of O_2 (min - max)	mg/kWh	19,7 - 71,5	19,7 - 98,7
N0x (value according to EN 297/A3 and EN 483	mg/kWh	33,9	34,68
N0x class	%	5	5
Flue losses with burner in operation (max)	mg/kWh	2,20	2,59

(*) Room Temperature = 20°C **(Reference gas: Natural Gas G20)**
(**) See Table Injectors - Pressures

2.6 - GENERAL FEATURES

		ALKON 50	ALKON 70
Appliance's family gas category		II_{2H3P}	II_{2H3P}
Min. water flow rate in CH circuit (Δt 20 °C)	l/min	3,86	5,4
Min. pressure in CH circuit	bar	0,5	0,5
Max. pressure in CH circuit	bar	6	6
Min. dynamic gas pressure (natural gas)	mbar	10	10
Water content in primary circuit	l	3,9	3,9
Max operating temp. in CH mode	°C	85	85
Min operating temp. in CH mode	°C	30	30
Total volume CH expansion vessel	l	-	-
Total pre-loading expansion vessel	bar	-	-
Max water content CH circuit (calculated for a max temp. of 82°C)	l	-	-
Min flow rate DHW circuit	l	-	-
Min. DHW inlet pressure	bar	-	-
Max DHW inlet pressure	bar	-	-
DHW specific flow rate (Δt 30 °C)	l/min.	-	-
DHW flow restrictor	l/min.	-	-
DHW production in continuous operation with Δt 45 K	l/min.	-	-
DHW production in continuous operation with Δt 40 K	l/min.	-	-
DHW production in continuous operation with Δt 35 K	l/min.	-	-
DHW production in continuous operation with Δt 30 K (*)	l/min.	-	-
DHW production in continuous operation with Δt 25 K (*)	l/min.	-	-
DHW adjustable temperature	°C	-	-
Electrical supply /power consumption	V-Hz	230/50	230/50
Fuse rating	A (F)	4	4
Maximum absorbed power (with optional modulating pump)	W	77 (172)	145 (290)
Electrical protection	IP	X4D	X4D
Net weight	kg	50	

3 INSTRUCTIONS FOR THE INSTALLER

3.1 - GENERAL WARNINGS

WARNING!
This boiler has to be destined for the use for which it has been expressively designed for. Any other use shall be considered improper and therefore dangerous.
This boiler is designed to heat water at a temperature inferior to boiling point at an atmospheric pressure.

WARNING!
These appliances are exclusively designed to be installed inside adequate boiler rooms. Therefore these appliances must not be installed and operated externally. An outdoor installation could cause malfunctioning and could be dangerous. For external installations, it is recommended to use appliances which are specifically designed and predisposed for this purpose.

Before installing the boiler the following points have to be carried out by a competent engineer:

a) The whole system should be thoroughly flushed in order to remove any residual dirt or grime which could compromise the correct boiler operation.
b) Check that the boiler has been preset for operating with the gas type available.
This is verifiable via the indication on the packaging and on the data badge;
c) Check that the chimney/flue pipe has an adequate draught,does not have any constrictions, and that no other appliance's flue outlets have been fitted, unless the chimney is serving more than one heating appliance, according tothe specific standards and regulations in force.
The connection between the boiler and chimney/flue outlet can be made only after this verification has been carried out.

WARNING!
In rooms where there is the presence of aggressive vapours or dust the appliance must operate independently from the air present in the boiler's location room, i.e. only in Type C version.

WARNING!
The appliance must be installed by a qualified engineer, who complies to the technical-professional requirements, who, under his own responsibility, guarantees the compliance of the standards according to the latest regulations.

WARNING!
The appliance must be installed only on a closed, vertical flat wall, made of non combustible material.
The appliance must be positioned so that at least the minimum operational and servicing clearances are provided.

The boiler must be connected to a heating system which is compatible to its performance and output.

3.2 - STANDARD CODES FOR INSTALLATION

The appliance must be installed in compliance to the instructions contained in this manual.

The installation must be carried out by a competent qualified engineer, whom will assume the responsibility of complying to all the local and/or national regulations published in the official publications, as well as all the applicable codes of practice.

Before installing the appliance please contact the gas supply company.

The installation must be carried out in accordance to the codes of practice, the regulations and the requirements hereby indicated which constitute an indicative list, but not a complete one, as these continue to undergo revisions.

Moreover, the boiler must be installed in accordance to all the regulations regarding the boiler room, the building regulations and the prescriptions regarding central heating plants in force in the country the boiler is installed.

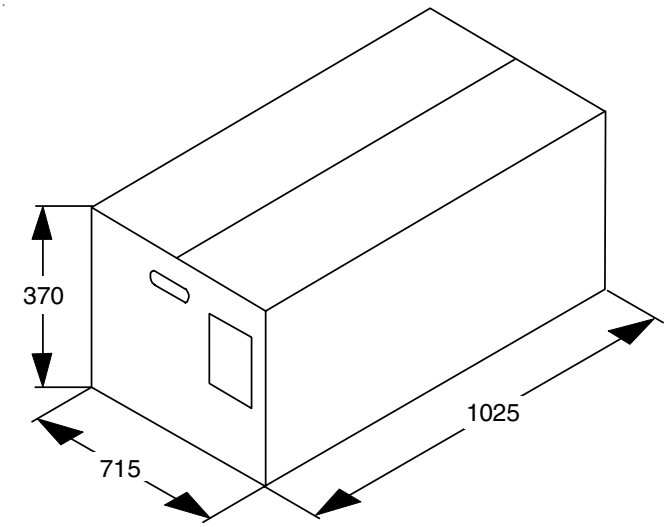
The appliance must be installed, commissioned and serviced according to the regulations in force. This is also valid for the hydraulic system, the flue outlet system and the boiler house.

3.3 - PACKAGING

The **ALKON 50/70** boiler is supplied fully assembled in a strong cardboard box.

After having unpacked the boiler check that it is intact and undamaged.

Keep the packaging material (cardboard box, plastic bags, polyester protection etc**.) out of the reach of children as they can be dangerous.**
UNICAL refuses all liability for injury to persons, animals or damage to property deriving from not having respected the above mentioned recommendations.



I**n the packaging**, in addition to the boiler, you can also find the following contents:

- Service logbook
- Instruction manual for the person in charge of the appliance
- Instruction manual for the installer and servicing personnel
- Warranty
- Nr. 2 spare parts request coupons
- N° 3 plastic plugs for fixing boiler
- Boiler support bracket
- Condensate evacuation siphon
- Aluminum pipe Ø 80 mm for smoke evacuation

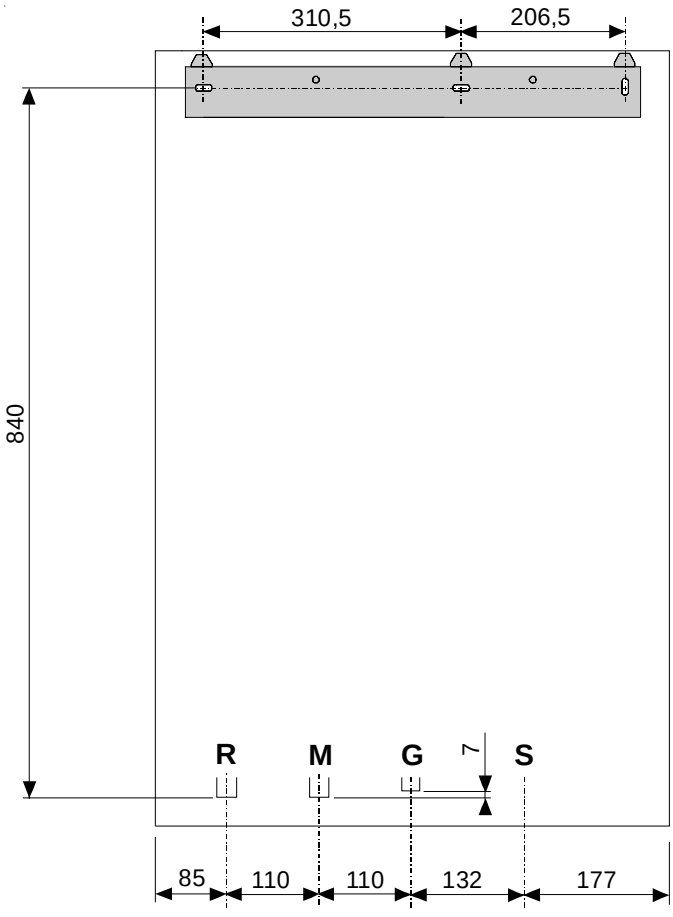
3.4 - BOILER LOCATION INSIDE A BOILER HOUSE

Special attention shall be paid to local regulations and laws about boiler houses and particularly to the obligation of keeping minimum clearances and empty space around the boiler. The installation shall be in compliance with all latest regulations and laws about boiler houses, installations of heating and hot-water systems, ventilation, chimneys capable of evacuating the flue gases of condensing boilers and any other applicable requirement.

When selecting the position for the installation of the boiler please comply to the following safety requirements:

- Guarantee an easy access to the components of the boiler to facilitate the possible operations of ordinary and extra-ordinary maintenance.
- Fit the appliance in rooms protected from frost;
- In rooms where aggressive vapours or dust are present, the appliance must be able to operate independently from the air of the location room;
- The appliance must be installed exclusively on a vertical and solid wall, capable of adequately supporting the weight of the boiler;
- The wall must not be made of inflammable material.

CONNECTIONS	ALKON 50	ALKON 70
M = *CH system flow*	1”	1”¼
R = *CH system return*	1”	1”¼
G = Gas Supply	3/4”	3/4”
S = Condensate Drain		



3.5 - INSTALLATION ON EXISTING HEATING SYSTEMS

When the appliance is installed on existing systems, ensure yourself that:

- The flue outlet pipe is suitable for condensing boilers, for the temperature of the products of combustion, calculated and manufactured according to the regulations in force. It must be installed as much as possible in a straight line, tested for soundness, insulated and must not have any occlusions or restrictions.
- The flue outlet pipe has a connection for the discharge of condensate.
- The boiler room has a suitable outlet for the discharge of condensate produce by the boiler.
- The electrical system has been fitted in compliance to the specific norms and the work has been carried out by a competent person.
- The circulation pump's output, the head and flow direction are suitable.
- The gas feeding supply pipe and the eventual tank are constructed according to the regulations in force.
- The expansion vessels assure the total absorption of the dilatation of the fluid contained in the system.
- The system has been cleaned of impurities and lime scale.

3.6 - GAS CONNECTION

The gas supply pipe must be connected to the boiler via the respective pipe connection ¾" as indicated on page 13.

The gas supply pipe must have a section which is identical or greater then the one used on the boiler and must assure a correct gas pressure.

It is however important to comply with the specific norms and requirements in force, foreseeing on-off valves, gas filter, anti-vibrating joint etc.

Before commissioning an internal gas distribution system and therefore before connecting it to the gas meter, the complete installation must be tested for gas soundness.

If any part of the system is concealed from view the gas soundness test must be carried out before covering the pipes.

DANGER!
The gas connection must be carried out by a registered engineer who will have to respect and comply to the regulations in force and to the requirements indicated by the local gas supplier. An incorrect installation could cause injury to persons, animals or damage to property. The manufacturer shall not be held liable for any injury and/or damage.

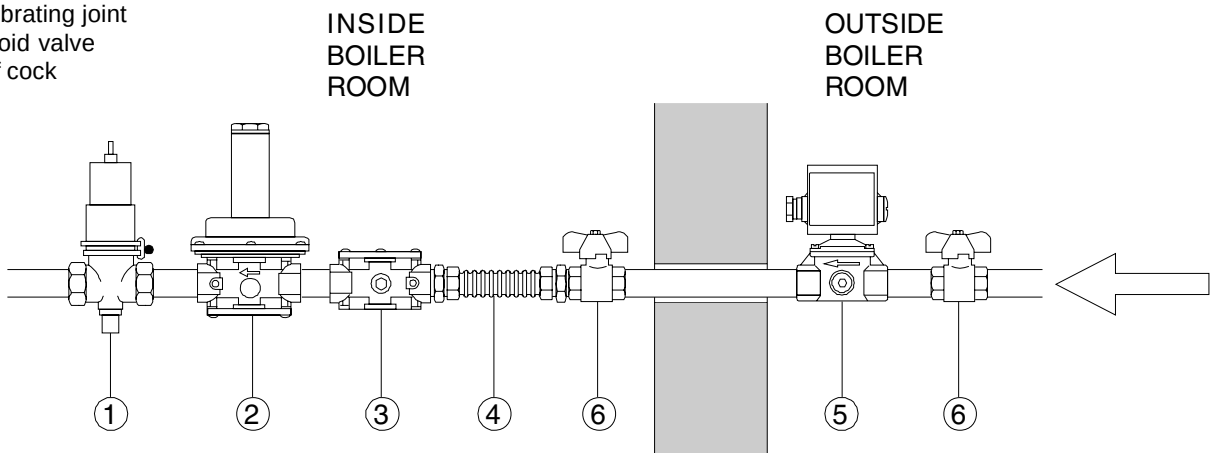
Before installing the boiler it is recommended to thoroughly clean all the supply piping in order to remove any eventual residual grime which could compromise the boilers correct functioning.

If you smell gas:
a. Do not turn on or off electrical switches, use the telephone or any other object which can provoke sparks;
b. Open all doors and windows in order to allow fresh air to enter and purify the room;
c. Close all gas cocks
d. Contact a service engineer, qualified installer or the gas supply company.

As a safety measure against gas leaks, Unical recommends installing a surveillance and protective system made up of a gas leakage detector combined with an on-off selenoid valve on the gas supply line.

EXAMPLE OF A GAS SUPPLY SYSTEM

1. On-off gas supply valve
2. Double membrane regulator
3. Gas filter
4. Anti-vibrating joint
5. Selenoid valve
6. On-off cock



3.7 - FLOW AND RETURN PIPE CONNECTIONS

The CH flow and return circuits have to be connected to the boiler via the respective connections 1" or 1"¼ as indicated on page 16.

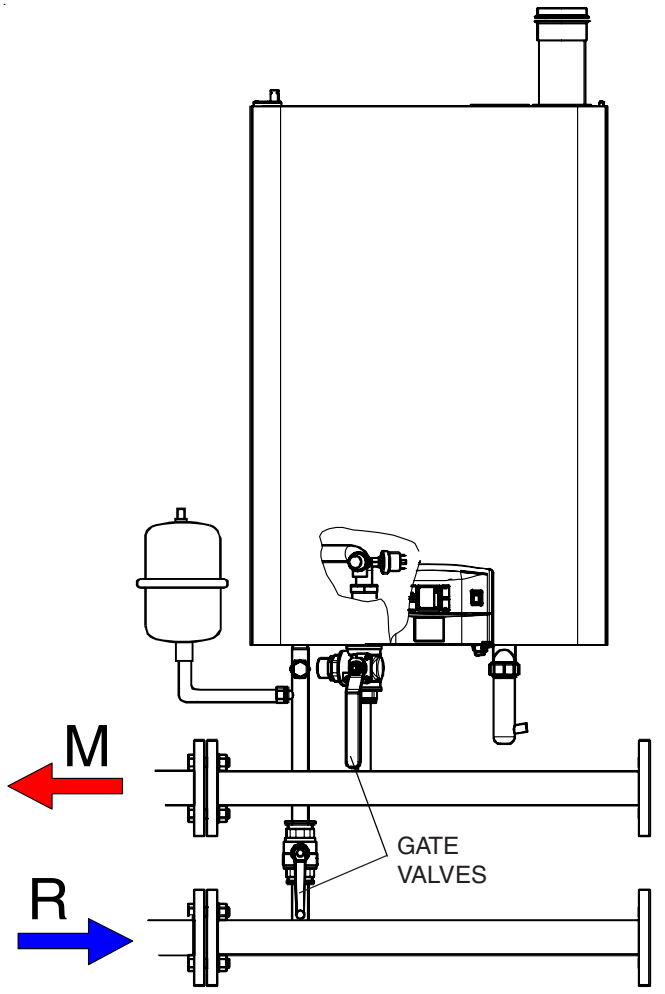
When determining the size of the CH circuit pipes it is essential to bear in mind the pressure losses induced by any of the system's components and by the configuration of the same system.

The route of the piping has to be conceived taking all the necessary precautions in order to avoid air locks and to facilitate the continuous purging of the system.

WARNING!
Before installing the boiler we recommend that the system is flushed out with a suitable product, in order to eliminate any metallic tooling or welding residues, oil and grime which could reach the boiler and affect the proper running of the boiler.

Non-observance of these instructions could cause injury to persons, animals or damage to property. The manufacturer shall not be held liable for any such injury and/or damage.

Ensure yourself that the system's piping is not used as the earth clamps for the electrical or telephonic system. They are absolutely unsuitable for this use. In a short time this could cause serious damage to the piping, boiler and radiators.



WARNING!
IT IS ABSOLUTELY FORBIDDEN TO FIT ON-OFF VALVES ON THE GENERATOR TO THE FORE OF THE SAFTEY DEVICES

3.8 - DETERMINATION OF PRIMARY BOILER PUMP OR BOILER SYSTEM PUMP

The boiler pump must have a delivery head which can ensure the water flow rate as shown in the diagram “Water pressure losses”.

The following table gives an indication of the pump’s flow rate in function of the Ät of the primary circuit if the installation has a mixing header

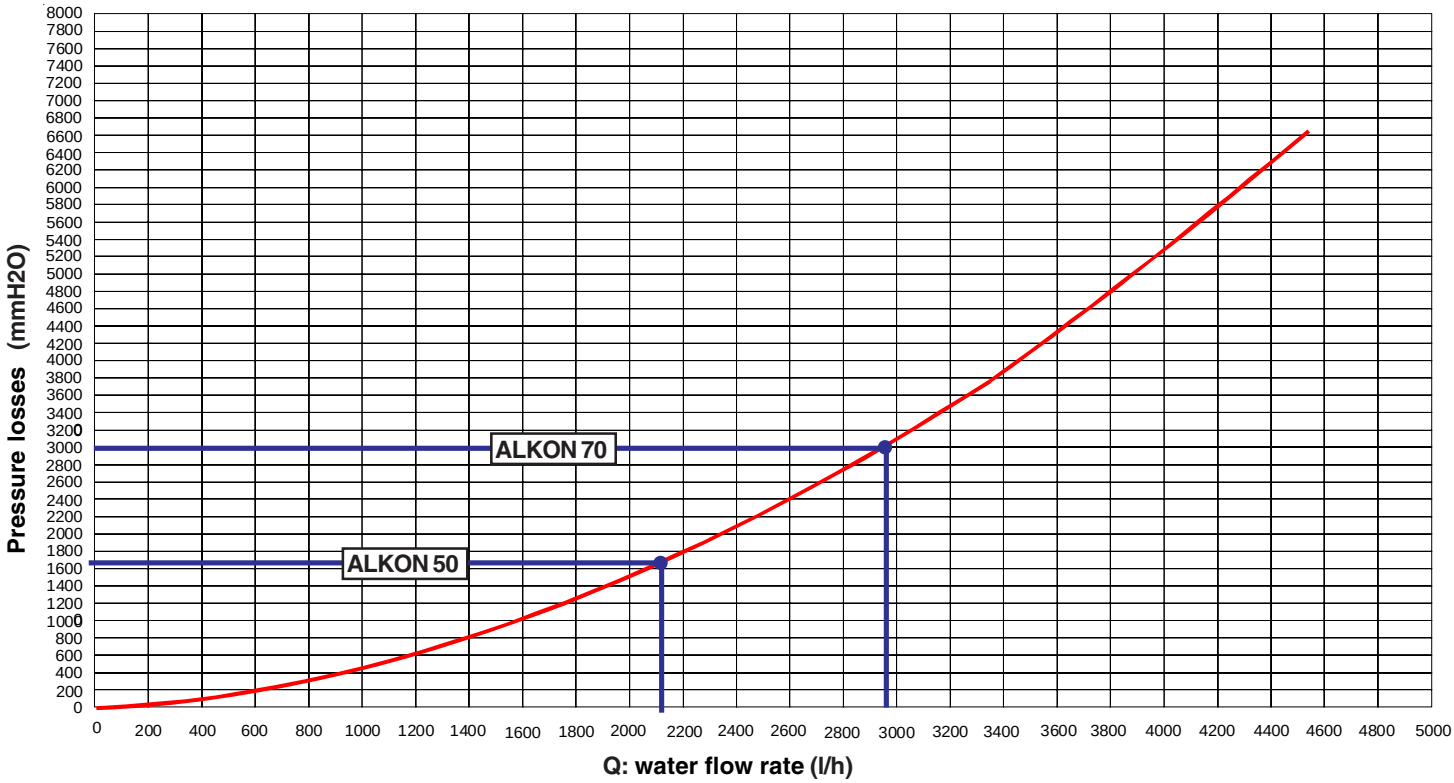
	ALKON 50	ALKON 70
Power supply in kW	**49,3**	**68,5**
Max flow rate demanded in l/h (ΔT 15K)	**2826**	**3927**
Portata nominale richiesta in l/h (Δ T 20K)	**2120**	**2946**

The size of the pumps must be determined by installers or technical engineers according to boiler data and system design.

The water side resistance curve of the boiler is shown in the following diagram. The pump is not an integral part of the boiler.

It is recommended to choose a pump with the rate and delivery head at about 2/3 of its characteristic heating curve.

WATER SIDE PRESSURE LOSSES



For a ΔT 20 K, the max. water flow rate requested is 2120 l/h.
From the graph of the boiler’s pressure losses, it can be determined that the pump must be able to guarantee a delivery head of at least 1,6 mH2O.

NOTE: The use of a mixing header fitted between the boiler circuit and the system circuit is always advisable. It becomes INDISPENSABLE if the system requires flow rates superior to the maximum permitted boiler flow rates, which is to say lower than 15K.

3.9 - SUPPLEMENTAL SAFETY, PROTECTIVE AND CONTROL DEVICES PRESCRIBED BY THE GOVERNMENT DECREE 01-12-1975 AND RELATIVE APPLICABLE TECHNICAL SPECIFICATIONS (CONTAINED IN THE "RACCOLTA R EDITION 1982")

CERTIFICATION OF THE SUPPLEMENTAL SAFETY DEVICES:

Several notified bodies prescribe supplemental safety devices.
For the safety valves and on-off gas valves it is necessary to obtain the ISPESL (Institution for preventive measures and safety at work) calibration certificate which confirms that they are free from lead or bossing.

The expansion vessels with a capacity superior to 24 litres must have be supplied with an approval booklet released by ISPESL and a manufacturers conformity declaration.

All the accessories must have an ISPESL approval certificate.

SAFETY DEVICES

1. On-off gas valve: a device which has the function of cutting off the gas supply when the water temperature reaches the max. predetermined value. The sensible element has to be installed as nearest as possible to the generator (flow pipe) at a distance which has to be < 500 mm and must not be able to be cut-off.

2. Pressure relief valve: it has the function of discharging in the atmosphere the fluid contained in the generator when this has, for whatever motive, reached the maximum working pressure.

PROTECTIVE DEVICES

3. Overheat thermostat: it has the function of shutting down the generator if the safety thermostat fitted in the boiler malfunctions. It must be calibrated to a value of < 100°C, which MUST not be changed.

4. Safety pressure switch: it has the function of shutting down the generator if it reaches the maximum working pressure. It must be able to be reset manually.

CONTROL DEVICES

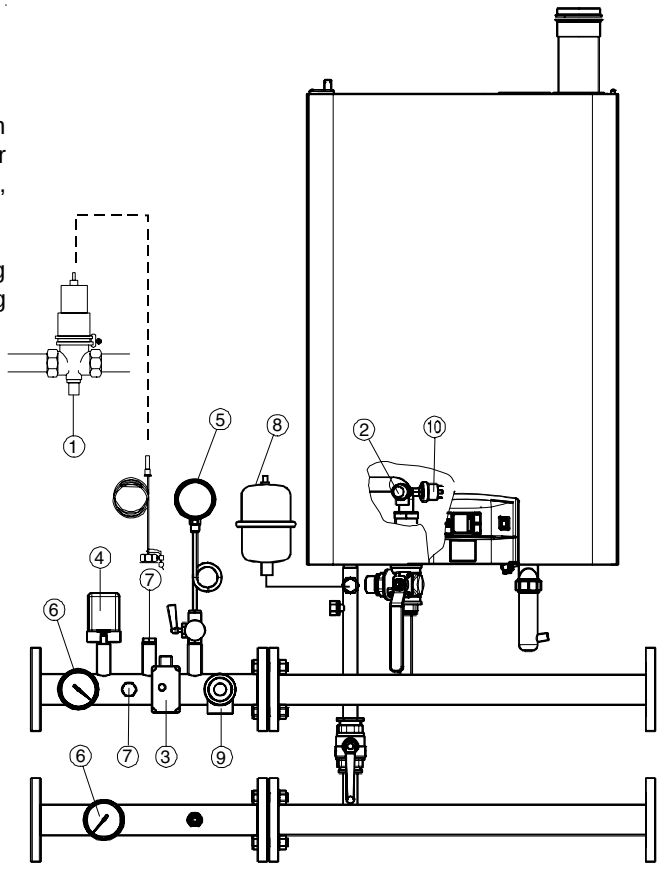
5. Pressure indicator with shock absorber tube and pressure gauge holder valve: it indicates the effective pressure existing in the generator. It must be graduated in "bar" and must have the maximum operating pressure in scale and be equipped with a 3-way valve with the connection for the manometer.

6. Thermometer: it indicates the effective water temperature contained in the generator. It must be graduated in degrees Celsius with a temperature scale not exceeding 120°C.

7. Bulb holder for a master temperature gauge: it must be fitted vertically and must have an inside dia. of 10 mm, in order to locate a mercury master thermometer.

8. Calibrated expansion vessel: it permits the absorption of the increase in volume of the system's water following an increase in temperature and its nominal maximum working pressure must be higher than the pressure relief valve's setting.

For the electrical connection of the additional safety devices make reference to the paragraph 3.17 - Connection of the additional safety devices.



3.10 - PRESSURE RELIEF VALVE DRAIN PIPE

A pressure relief valve must be fitted on the flow pipe, within 0,5 m from the boiler. It must be dimensioned for the capacity of the boiler and must comply to the regulations in force,

WARNING!
Please remember that it is forbidden to interpose, between the boiler and the pressure relief valve, any type of cutting-off device. Moreover it is recommended to use cutting-off valves which do not exceed the maximum allowable operating pressure.

WARNING!
In correspondence to the heating pressure relief valve foresee the installation of a discharge pipe with a funnel and a siphon which lead to an adequate drainage. The drainage has to be controllable by sight.
If this precaution is not made, an eventual intervention of the pressure relief valve could cause injury to persons, animals or damage to property. The manufacturer shall not be held liable for any injury and/or damage.

3.11 - WORKING PRESSURE

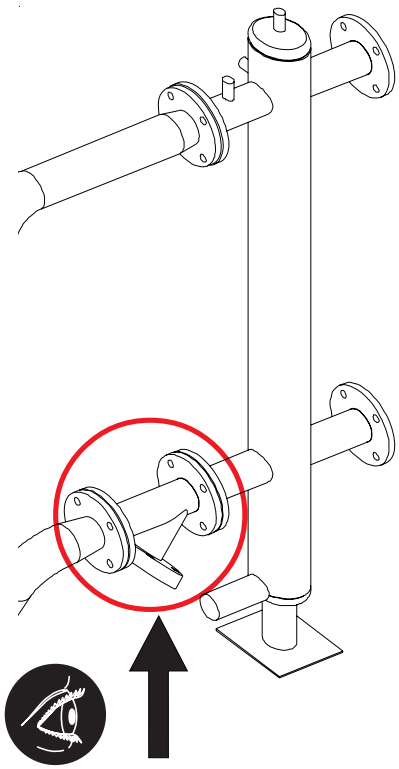
The boiler's maximum allowable working pressure is set at 3 bar; whilst the minimum pressure is pre-charged to 0,5 bar.

WARNING!
The boiler doesn't integrate any specific device against the lack of water, because this function is performed by the high limit thermostat (overheating).

Note: On the main PCB it is alwys possible to electrically connect a minimum water pressure switch against the lack of water.

3.12 - MIXING HEADER FILTER

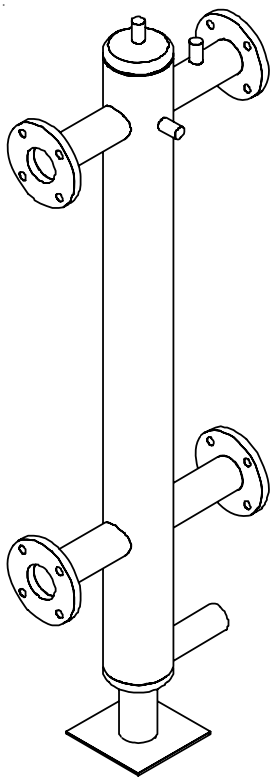
UNICAL suggests the installation of a Y filter on the return pipe so that it can be cleaned if necessary.
This filter will protect the boiler from the heating system dirt.



3.13 - MIXING HEADER (cod. 00361333-00361499-00361500)

In order to ensure correct boiler operation it is necessary to use a mixing header which guarantees:

- the separation and collection of circuit dirt
- optimal air venting
- hydraulic de-coupling of the two hydraulic circulation circuits
- balancing of the circuits

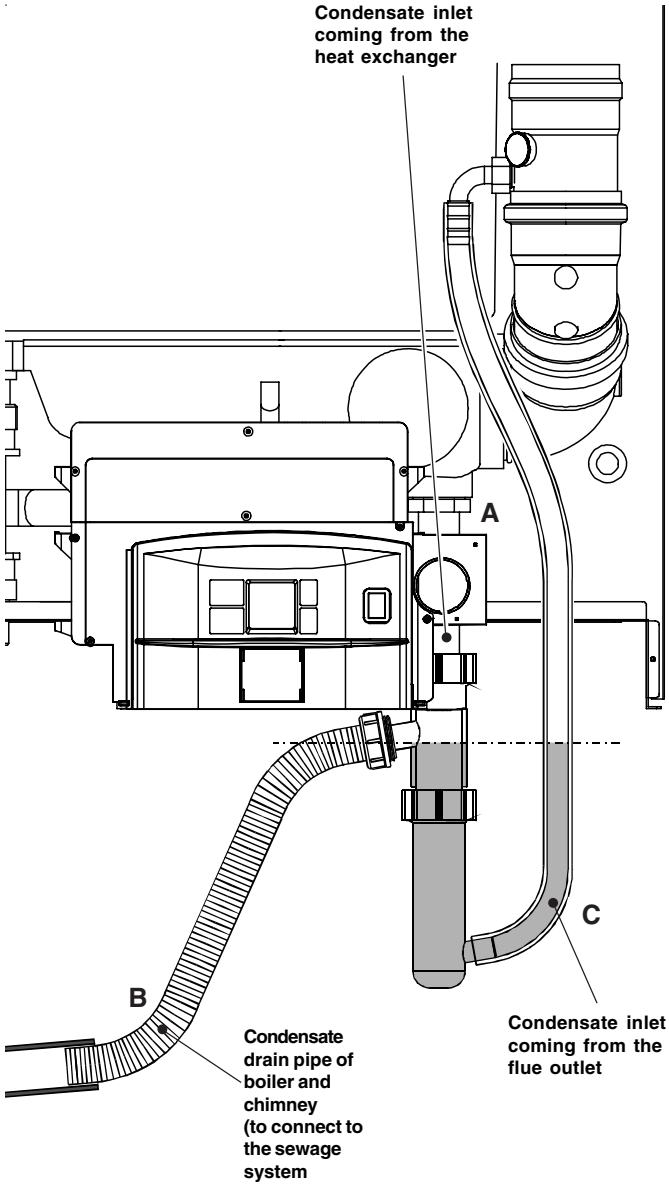


3.14 - CONDENSATE DRAIN

During the combustion process the boiler produces condensate which, through the “A” pipe, flows into the siphon. The condensate which forms inside the boiler has to be routed into an adequate drain by means of the pipe “B”.

DANGER!
Before commissioning the appliance fill the siphon and check the correct drainage of the condensate.
If the appliance is used with the condensate drain siphon empty there could be danger of intoxication resulting from the escape of flue gasses.

The connection between the appliance and the sewage system must be carried out in compliance with the specific reference standards, and in particular:
- prevent the end user utilizing the condensate produced;
- a siphon must be fitted (supplied with the boiler);
- there must be no bottlenecks;
- the connection must be made just under the bottom part of the boiler;
- it must be installed so as to avoid freezing of the liquid when the boiler is operating and prevent the eventual pressurization of the sewage system;
- consent the correct downflow of the appliance’s liquid discharges;
- it must be made with one of the following materials which are resistant to condensate:
  - Grès, according to the Standards DIN 1230-1 and 6, EN 295-1 or 2 or 3;
  - Glass (boron silicate);
  - Polyvinyl chloride (PVC) , according to DIN V 19534-1 and 2, and DIN 19538;
  - Polyethylene (PE) DH type, according to DIN 19535-1 and 2 and DIN 19537-1 and 2;
  - Polypropylene (PP) and copolymer styrene (ABS) according to DIN V 19561;
  - Polyesterific resin (GF-UP), according to DIN 19565-1;
  - Stainless steel.


Condensate inlet coming from the heat exchanger
A
B
C
Condensate drain pipe of boiler and chimney (to connect to the sewage system
Condensate inlet coming from the flue outlet

3.15 - WATER TREATMENT

The chemical/physical features of the heating system's water are fundamental for the boiler's correct operation and safety.

Among the inconvenients caused by the bad quality of the feeding water, the most frequent and the most serious is the incrustation of the boiler thermal exchange surfaces.

Less frequent, but also serious, is the hydraulic circuit surfaces.

It is ascertained that the boiler incrustations, due to their low thermal conductivity, highly reduce the thermal exchange, even if with a thickness of some millimetres and provoque a very dangerous localised overheating.

We suggest to make the water treatment of the heating circuit in the following cases:
a) When the hardness of the water is higher than 15°f;
b) For C.H. installations with large water content;
c) Renewal of the water system due to uncontrolled leakages;
d) Subsequent refilling of the system due to maintenance works on the installation;
e) Presence of different metals in the hydraulic circuit.

The scope of this treatment is finalized for eliminating or substantially reducing the following problems:
- lime scale deposit
- corrosion sludge
- deposits
- microbiological growths (moulds, bacteria etc.)

An appropriate treatment of the supply water will prevent the above stated problems and will maintain the correct operation and efficiency of the generator in time.

For this purpose it will be necessary to fix the following chemical-physical characteristics of the water:

PH include between 6,5 and 8
Hardness 15° FR

Therefore, before filling the heating system it will be necessary to fit the devices indicated in the figure.

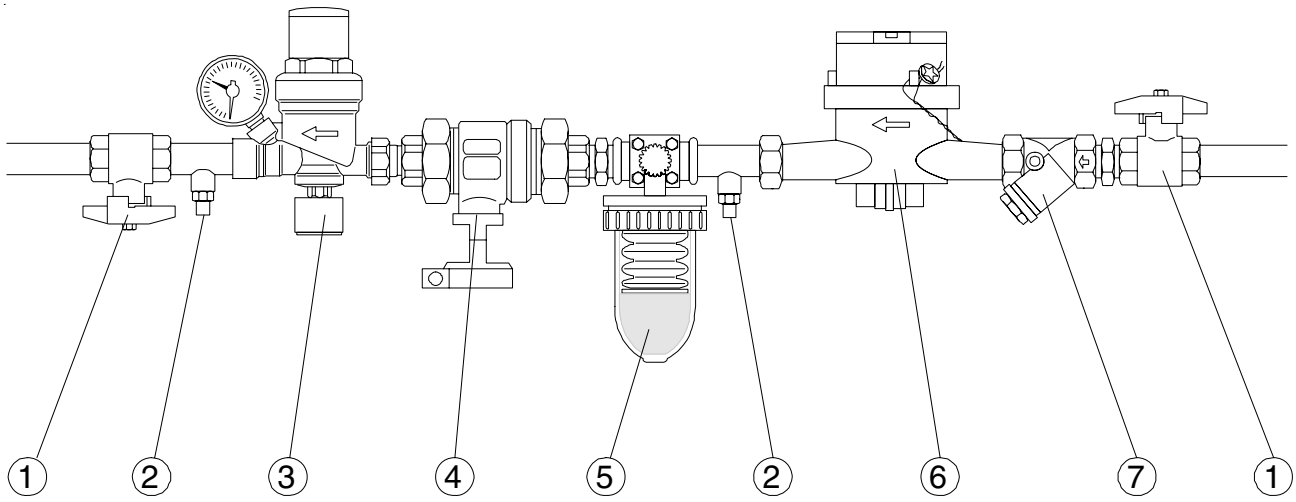
THE INSTALLATION MUST BE FORESEEN ON THE RETURN PIPE OF THE PRIMARY CIRCUIT DOWNSTREAM OF THE CIRCULATING PUMP.

All necessary precautions must be taken for preventing the formation and localization of oxygen in the system's water. For this reason, ensure yourself that the plastic piping used in underfloor heating systems is impermeable to oxygen.

If any anti-freeze solutions are used ensure that they are compatible with aluminium and any other boiler components and materials.

WARNING!
Any damage caused to the boiler due to the formation of lime scale or by corrosive water will not be covered by the warranty.

EXAMPLE OF SCALE REDUCING DEVICE CONNECTION FOR WATER TREATMENT



1 BALL VALVE
2 INSPECTION POCKET
3 FILLING MANIFOLD
4 DISCONNECTOR
5 SCALE REDUCING DEVICE
6 LITER COUNTER (Recommended)
7 Y filter

3.16 - FLUE OUTLET INSTALLATION

The flue system must be installed in accordance with the local and national Standards.

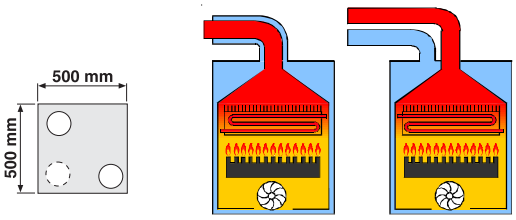
.

We recommend using only original UNICAL flue outlet systems.
Damages caused by installation errors and for non-observance of the instructions given by the manufacturer will invalidate all the supplier's contractual or extra contractual responsibilities.

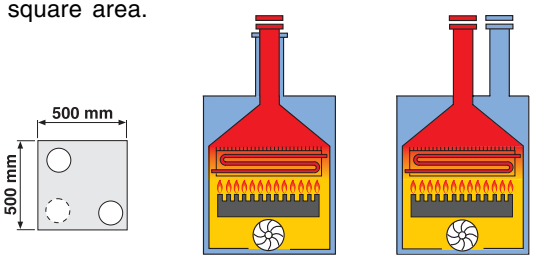
If the boiler has to be replaced ALWAYS replace the flue outlet system.

The boiler has been approved for the following flue configurations:

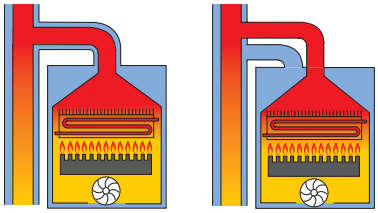
C13 oiler designed for connection to horizontal inlet and outlet terminals, which admit fresh air to the burner and discharge the products of combustion to the outside through concentric or twin ducts.
The minimum distance between the inlet air duct and the flue outlet duct must be of 250 mm and both terminals must be positioned within a 500 mm square section.



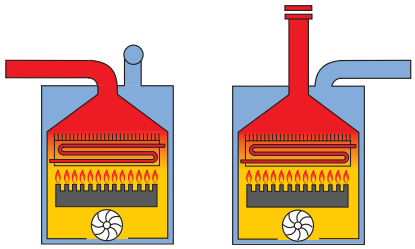
C33 Boiler designed for connection to vertical inlet and outlet terminals, which admit fresh air to the burner and discharge the products of combustion to the outside through concentric or twin ducts.
The minimum distance between the air inlet duct and the flue gas outlet duct must be of 250 mm and moreover both terminals must be positioned within a 500 mm square area.



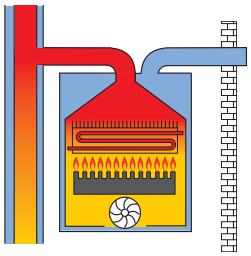
C43 Boiler designed for connection to collective flue systems including two ducts, one for the air inlet and the other for the discharge of products of combustion through concentric or twin ducts.



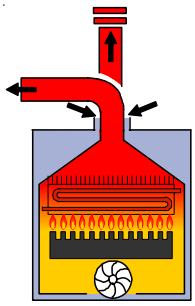
C53 Boiler with separate air inlet and products outlet. These ducts can discharge into areas with different pressure.
The two terminals must not be fitted on to two opposite walls.



C83 Boiler designed for connection to a terminal for the intake of combustion air and to an individual or collective chimney for the discharge of the products of combustion.
The chimney must comply to the current regulations.

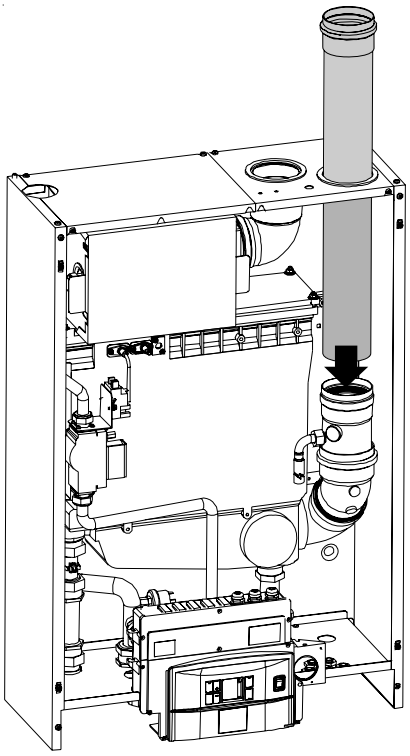


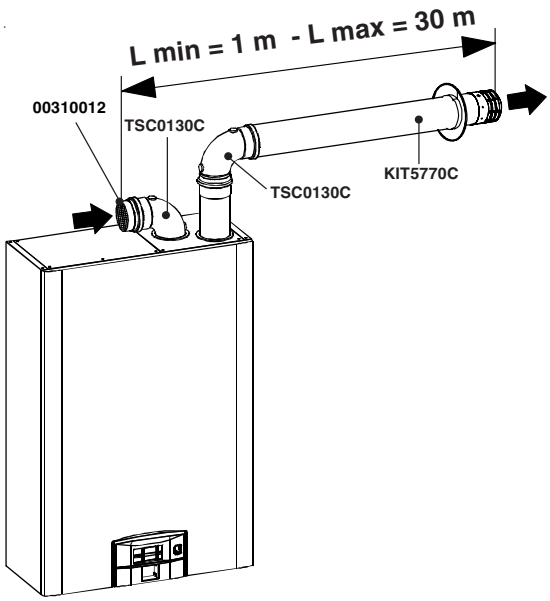
B23 Boiler designed to be connected to an open flue which will terminate vertically through the roof. The combustion air is withdrawn directly from the room where the boiler is installed.
WARNING: for this type of connection the room must comply with the same installation regulations valid for open chimney boilers.
The chimney must comply to the current regulations.



FLUE OUTLETS Ø 80 mm Type B23

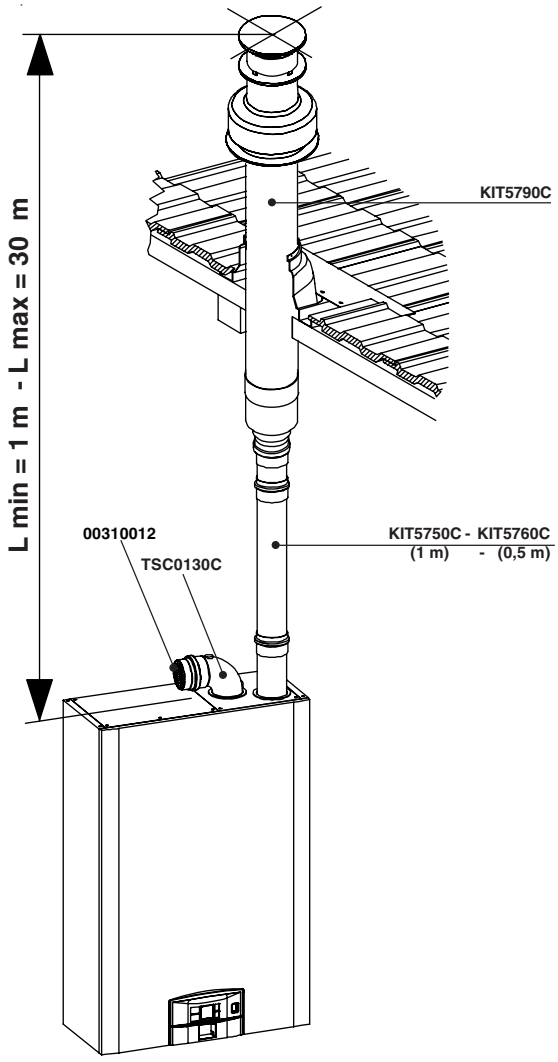
Preliminary operations:
Fit the smoke evacuation pipe Ø 80 mm, supplied in the carton, as shown in the picture.





The total allowed linear maximum length of the smoke evacuation and air intake pipes, of Ø 80 mm, is 30 m, including one wide radius curve and one evacuation terminal.

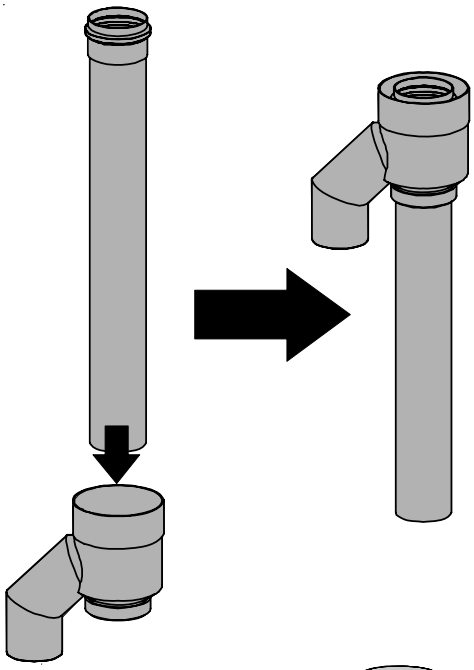
ATTENTION!
In the case in which danger of freezing subsists, the insulation of the smoke evacuation pipe is recommended on the whole length, in both cases, outside or in the chimney.

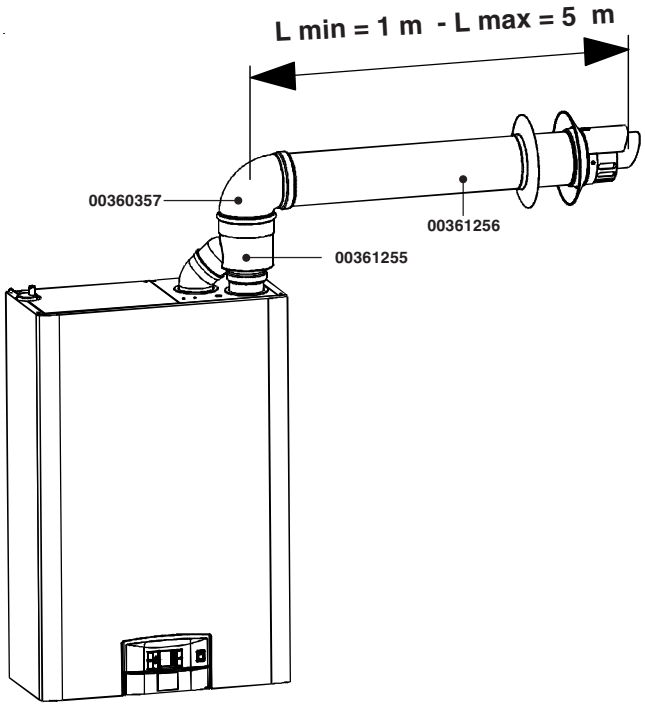


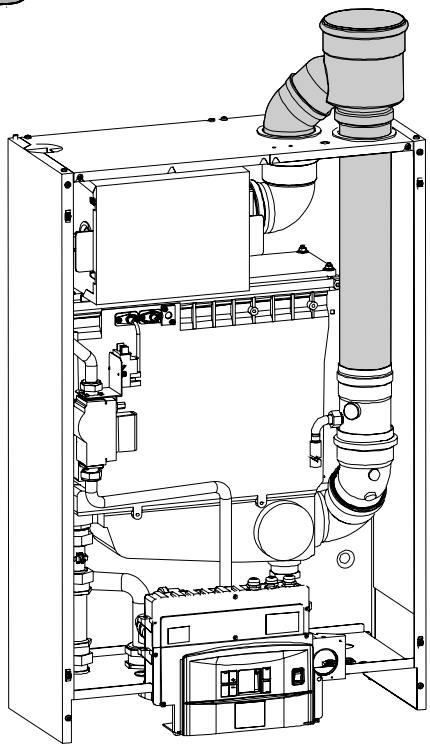
HORIZONTAL FLUE OUTLET WITH CONCENTRIC DUCTS Ø 80/125 mm - Type C 13

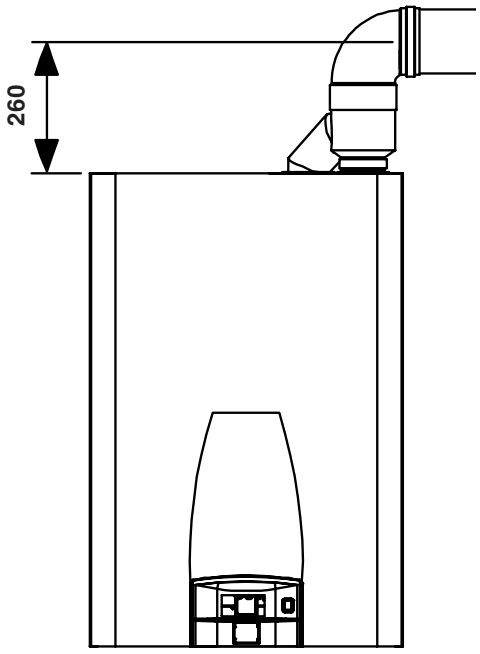
Preliminary operations:
- Insert the supplied pipe Ø 80 in the adapter for coaxial pipes Ø80/125 (code 00361255)
- Fit the assembly pipe/adapter on the boiler as shown in figure.

The minimum allowed length of the horizontal coaxial pipes is **1 meter.**
The maximum allowed length of the horizontal coaxial pipes is **5 meters.**
For every additional curve the maximum allowed length must be reduced by 1 meter; besides the duct has to have an upward inclination of 3% in the direction of exit, so that to allow the collection of the condensate in to the boiler.







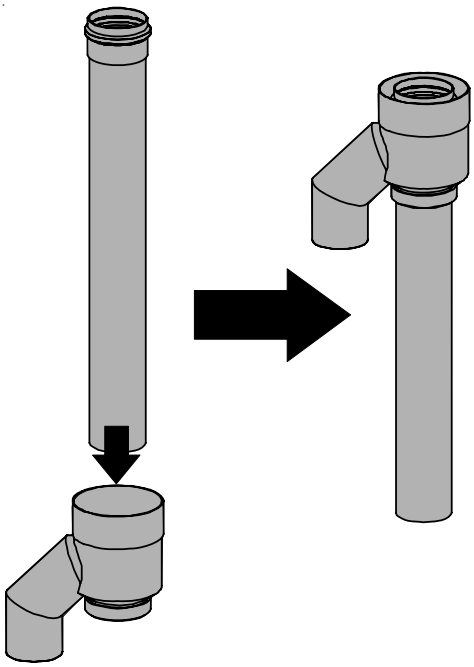


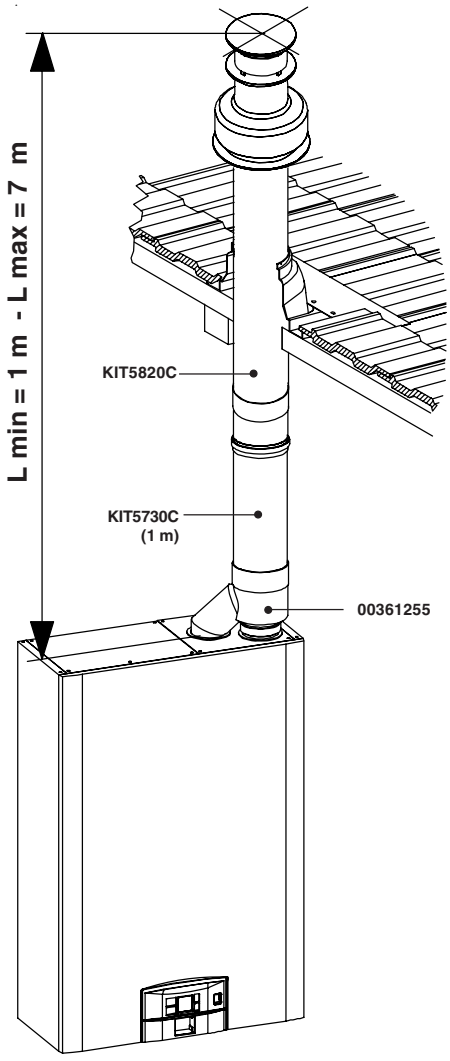
VERTICAL FLUE OUTLET WITH COAXIAL DUCTS Ø80/125 mm - TYPE C 33

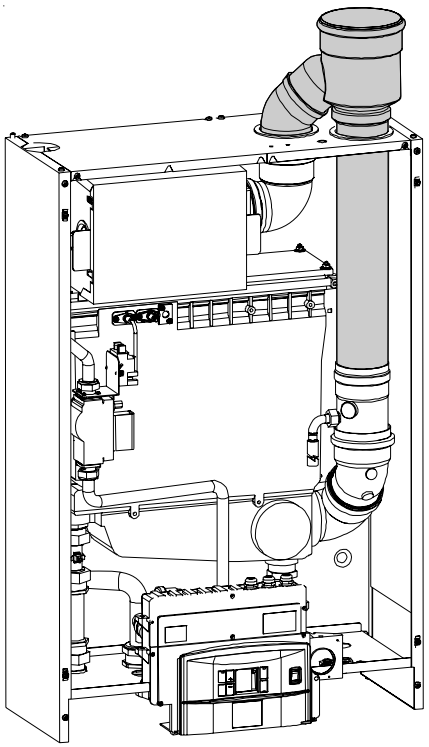
Preliminary operations:

- Insert the supplied pipe Ø 80 in the adapter for coaxial pipes Ø80/125 (code 00361255)
- Fit the assembly pipe/adapter on the boiler as shown in figure.

The minimum allowed length of the horizontal coaxial pipes is 1 meter.
The maximum allowed length of the horizontal coaxial pipes is 7 meters.
For every additional curve the maximum allowed length must be reduced by 1 meter.
Layout NOT suitable for ALKON 70



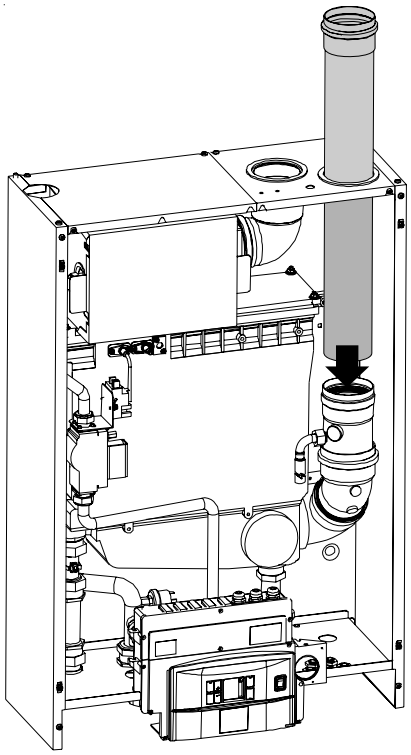


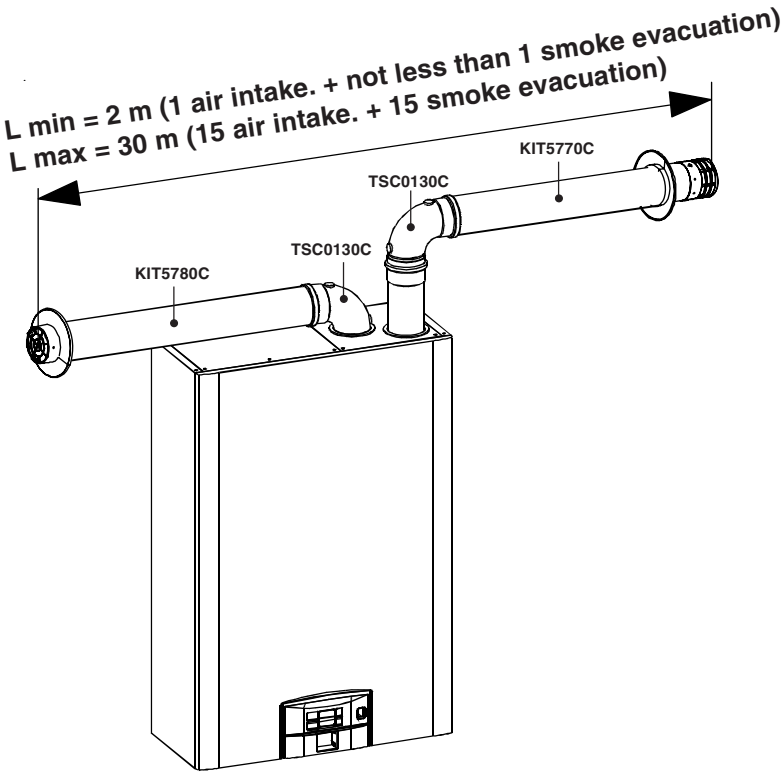


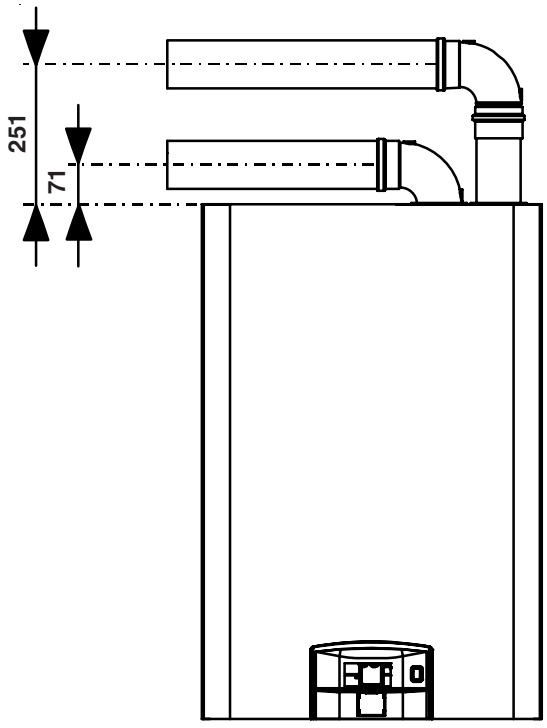
Smoke evacuation by two separate ducts Ø 80 mm - Type C53

Preliminary operations:
- Fit the supplied pipe of Ø 80 mm, as shown in the picture.

The maximum allowed pressure drop, independently from the type of installation, doesn't have to overcome the value of 60 Pa.




L min = 2 m (1 air intake. + not less than 1 smoke evacuation)
L max = 30 m (15 air intake. + 15 smoke evacuation)
KIT5770C
TSC0130C
TSC0130C
KIT5780C



3.17 - ELECTRICAL CONNECTIONS

Regulations in force

The elctrical safety of the appliance is assured only when it is correctly earthed, according to the electrical rules in force. The gas, D.H.W. and the CH system pipes cannot be used as ground plates.

Ensure that the above safety electrical requirements subsist; in case of doubt, ask for a professionally qualified technician to check the appliance's electrical system.

UNICAL refuses responsibility for any damages arising from failure to earth the boiler correctly.

It is necessary that a qualified technician verifies that the electrical system is adequate to the appliance's maximum absorbed power, indicated on the data plate, verifying in particular that the section of the system's cables is suitable to the appliance's maximum absorbed power.

For the appliance's general electrical supply the use of adaptors, multiple sockets and/or extension cords is strictly forbidden.

The use of any power supplied equipment implies the observance of several fundamental rules, such as:
- Do not touch the appliance with any wet part of your body and/or barefooted;
- Do not pull the supply cables
- Do not expose the boiler to sunlight, rain, etc., unless it is explicitly foreseen;
- Do not permit children or inexpert people to use the appliance.

Mains electrical supply connection 230V

Mains electrical supply connection 230V

The boiler is provided complete with a mains supply cable 1,5 m long and with a cross section area of 3x0,75 mm2.

The electric connections of the boiler are shown in the section named "ACTUAL WIRING DIAGRAM" (paragraph 3.18 page 33)

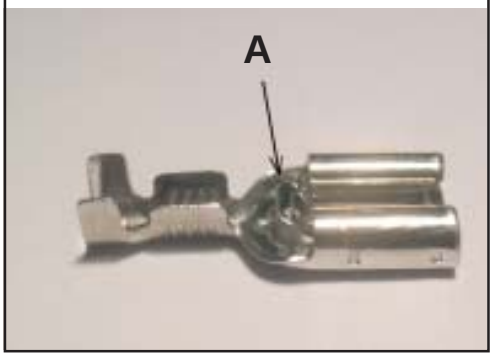
A mains supply of 230 V – 50 Hz is required. The wiring to the boiler must be in accordance with the current CEI regulations.

WARNING!
We remind you that upstream of the electrical connection, it will be necessary to foresee a service relay (NOT SUPPLIED) which, when the additional electrical safety devices (if any) intervene, shuts down the electrical supply to the on-off fuel valve fitted on the gas supply circuit, but not to the boiler so as to guarantee the running of the pump and permit the boiler to cool down.

DANGER!
The electrical connections must be carried out only by a qualified engineer.
Before carrying out the connections or any other operation on the electrical parts, always switch off and disconnect the electricity supply and ensure yourself that it cannot be accidentally turned on.

It is necessary to fit a double pole switch on the electrical supply line, having a 3 mm contact separation in both poles, in an easy accessible position in order to make quick and safe the servicing operations.

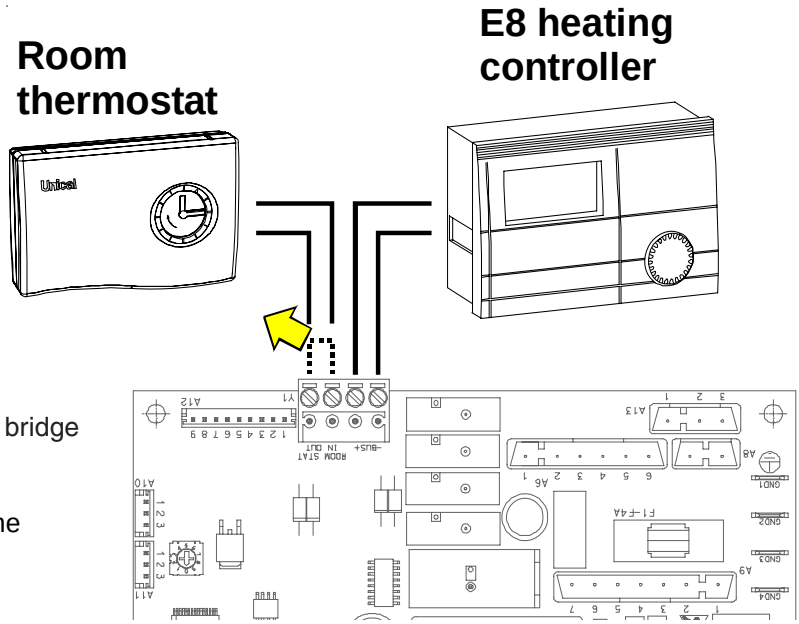
FASTON BLOCKING
If necessary the faston can be disconnected by slightly folding up, with a point, the blocking tongue '' Á. ''.



Room thermostat and/or E8 heating controller connection

DANGER!
Switch off and disconnect the electricity supply before carrying out any operations on the electrical parts.

For the connection of the E8 heating controller, to remove the "bridge wire" existing between the terminals 1 and 2.

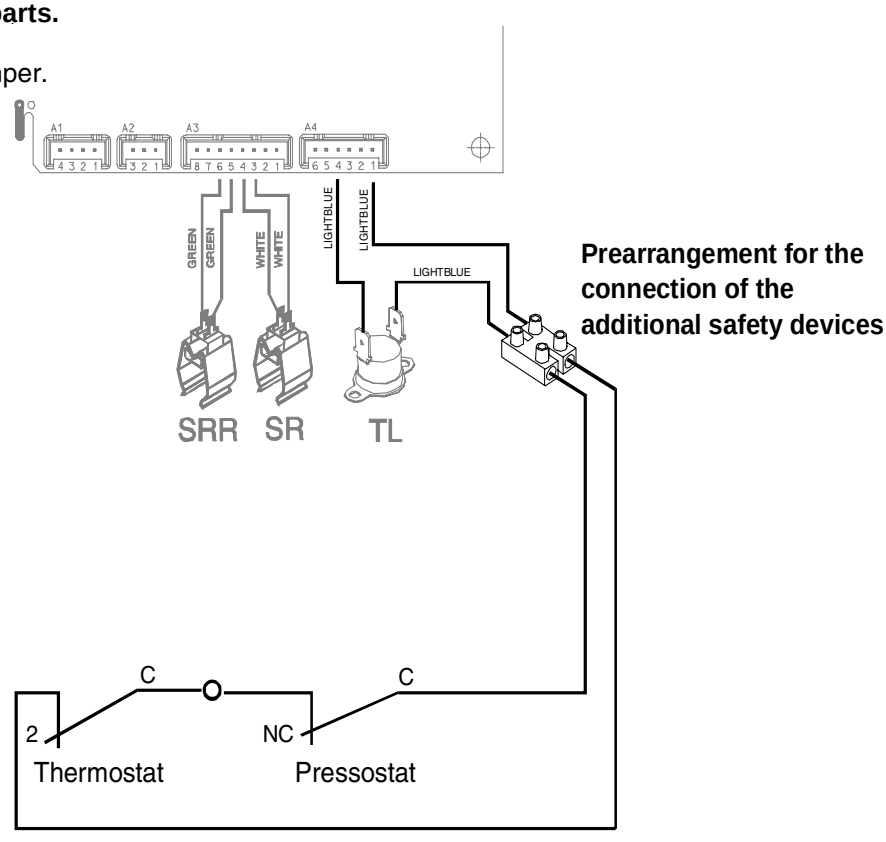


- Gain access to the **Y1** terminal board
- A Room Thermostat will be connected to the terminals 1 and 2 after removal of the existing bridge wire.
- For the **Heating Controller** connection use the connecting terminals **3** and **4**.

Connection of the additional safety devices

DANGER!
Switch off and disconnect the electricity supply before carrying out any operations on the electrical parts.

- For the connection remove the existing jumper.



Prearrangement for the connection of the additional safety devices

The opening of the additional safety devices doesn't stop the boiler pump operation.

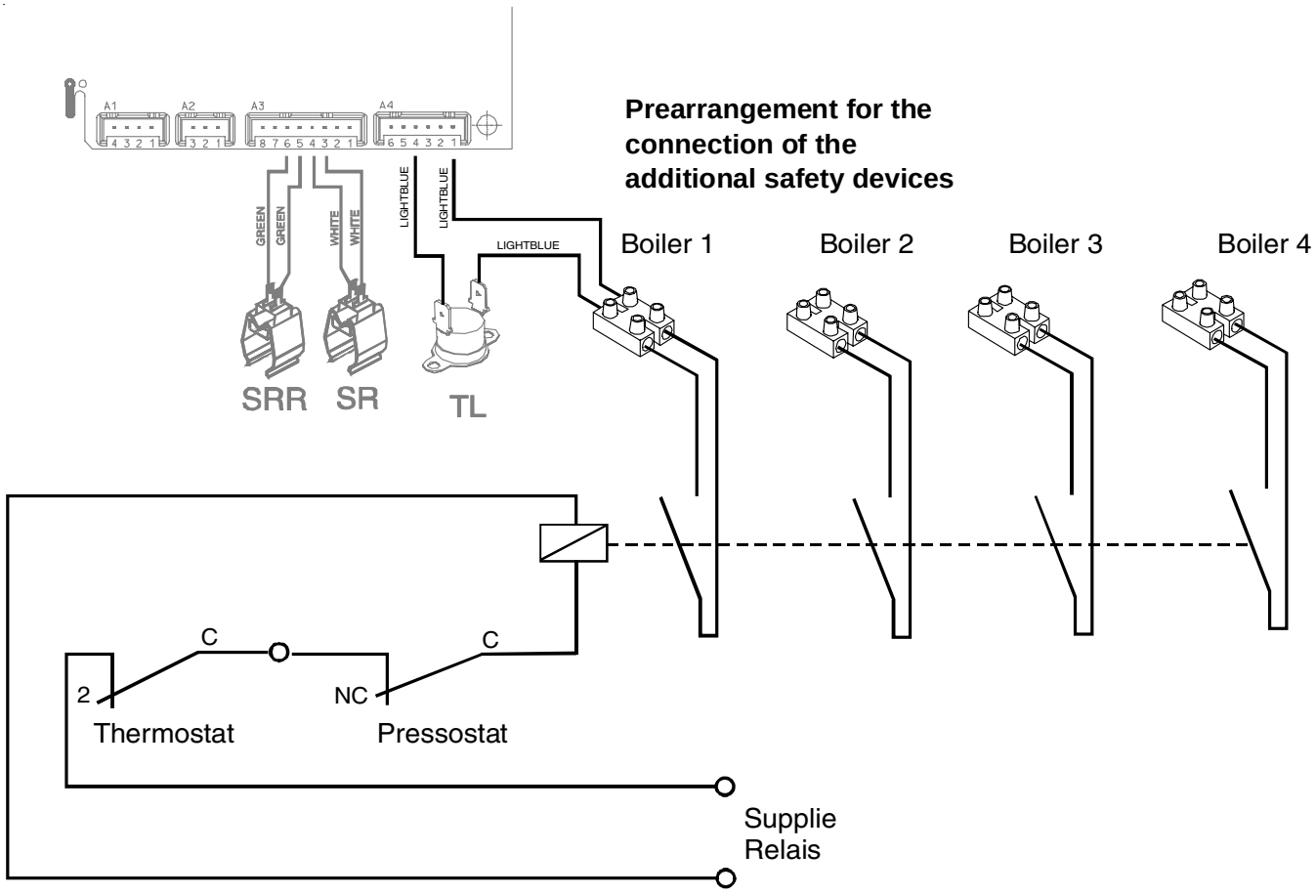
Connection of the additional safety devices for ALKON in battery

DANGER!
Switch off and disconnect the electricity supply before carrying out any operations on the electrical parts.

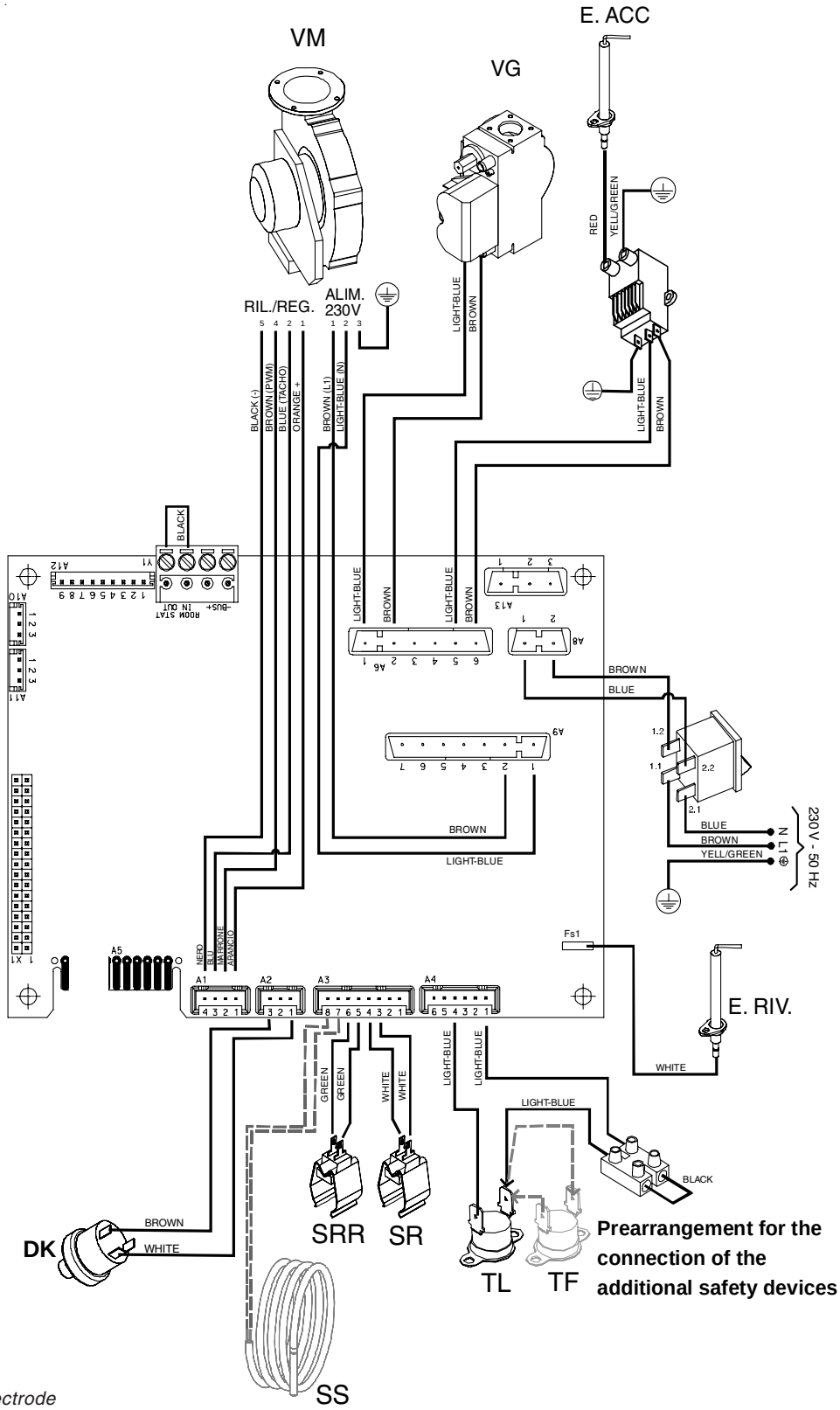
- For the connection remove the existing jumper.

Attention
To maintain isolated the contacts ISPESL of the different boilers suffers the ache operation of the same ones

Prearrangement for the connection of the additional safety devices



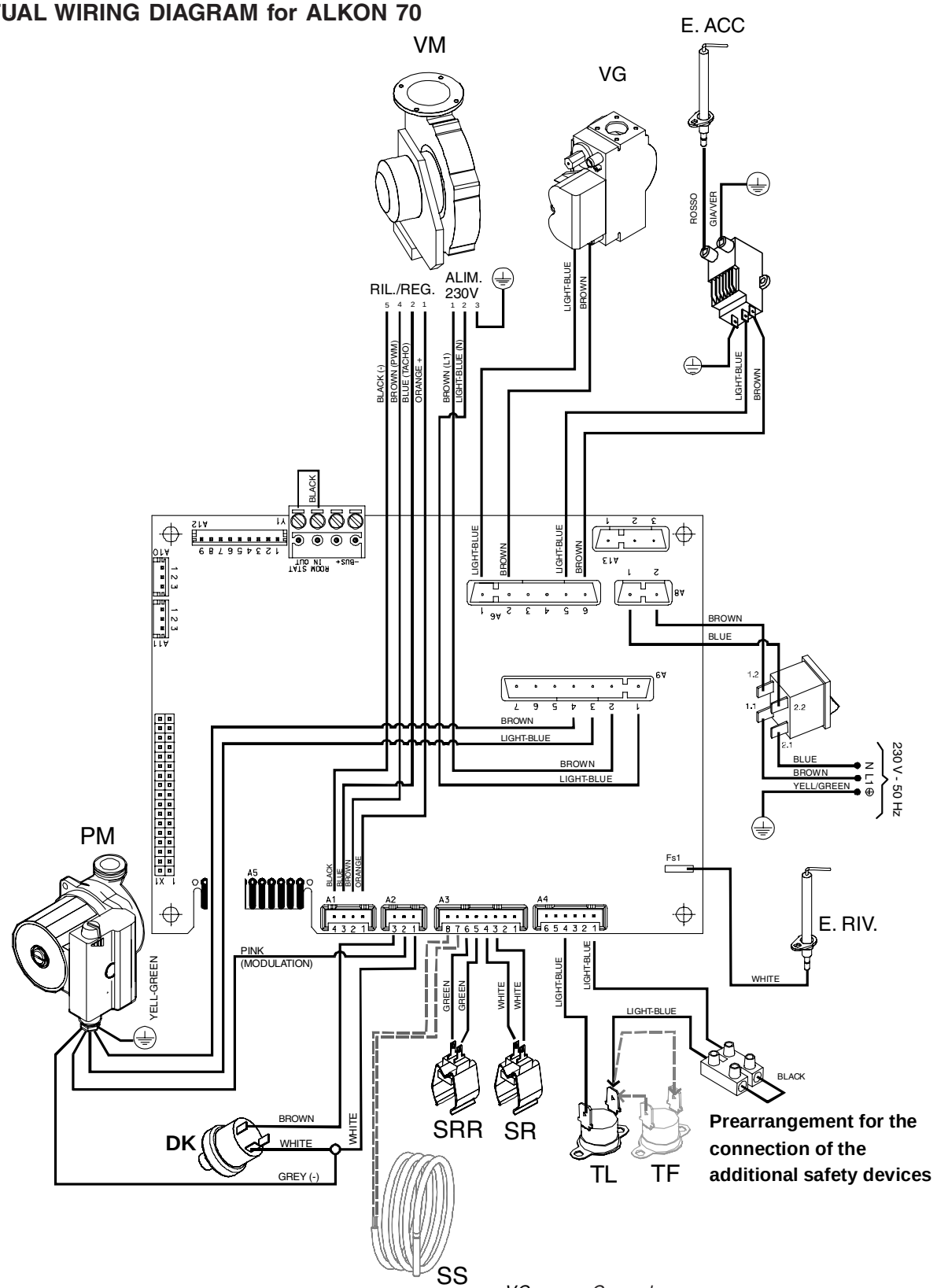
3.18 - ACTUAL WIRING DIAGRAM for ALKON 50



E. ACC = Ignition electrode
E. RIV. = Detection electrode
DK = Minimum water pressure switch
SR = CH sensor
SRR = CH return sensor
SS = DHW sensor (optional)
TL = Limit thermostat
TF = Smoke thermostat (only pre-arrangement)
VG = Gas valve
VM = Modulating fan detection/adjustment

Note: The pictures shown on the actual wiring diagram, is purely indicative.

ACTUAL WIRING DIAGRAM for ALKON 70



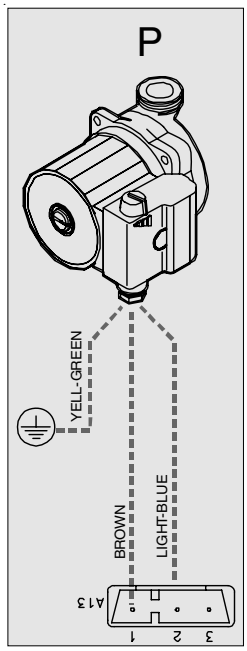
Prearrangement for the connection of the additional safety devices

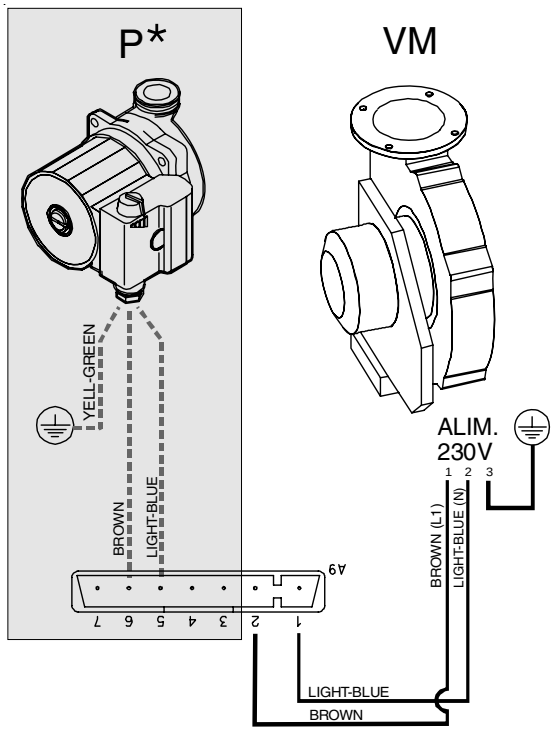
E. ACC = Ignition electrode
E. RIV. = Detection electrode
DK = Minimum water pressure switch
MDV = Motor 3 way valve
PM = Modulatin pump
SR = CH sensor
SRR = CH return sensor
SS = DHW sensor (optional)
TL = Limit thermostat
TF = Smoke thermostat (only pre-arrangement)

VG = Gas valve
VM = Modulating fan detection/adjustment

Note: The pictures shown on the actual wiring diagram, is purely indicative.

Boiler pump at constant flow rate (optional cod. 00361321 ALKON 50)

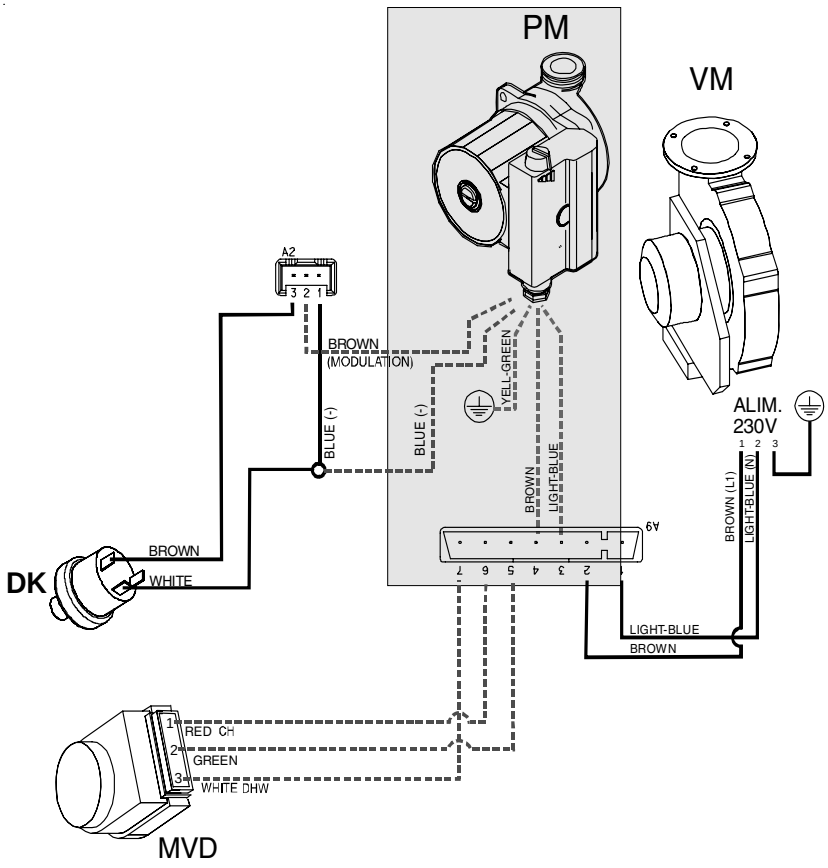




P = Boiler pump at constant flow rate, controlled via an ON/OFF Room thermostat

P * = Boiler pump at constant flow rate, controlled via the heating controller E8.

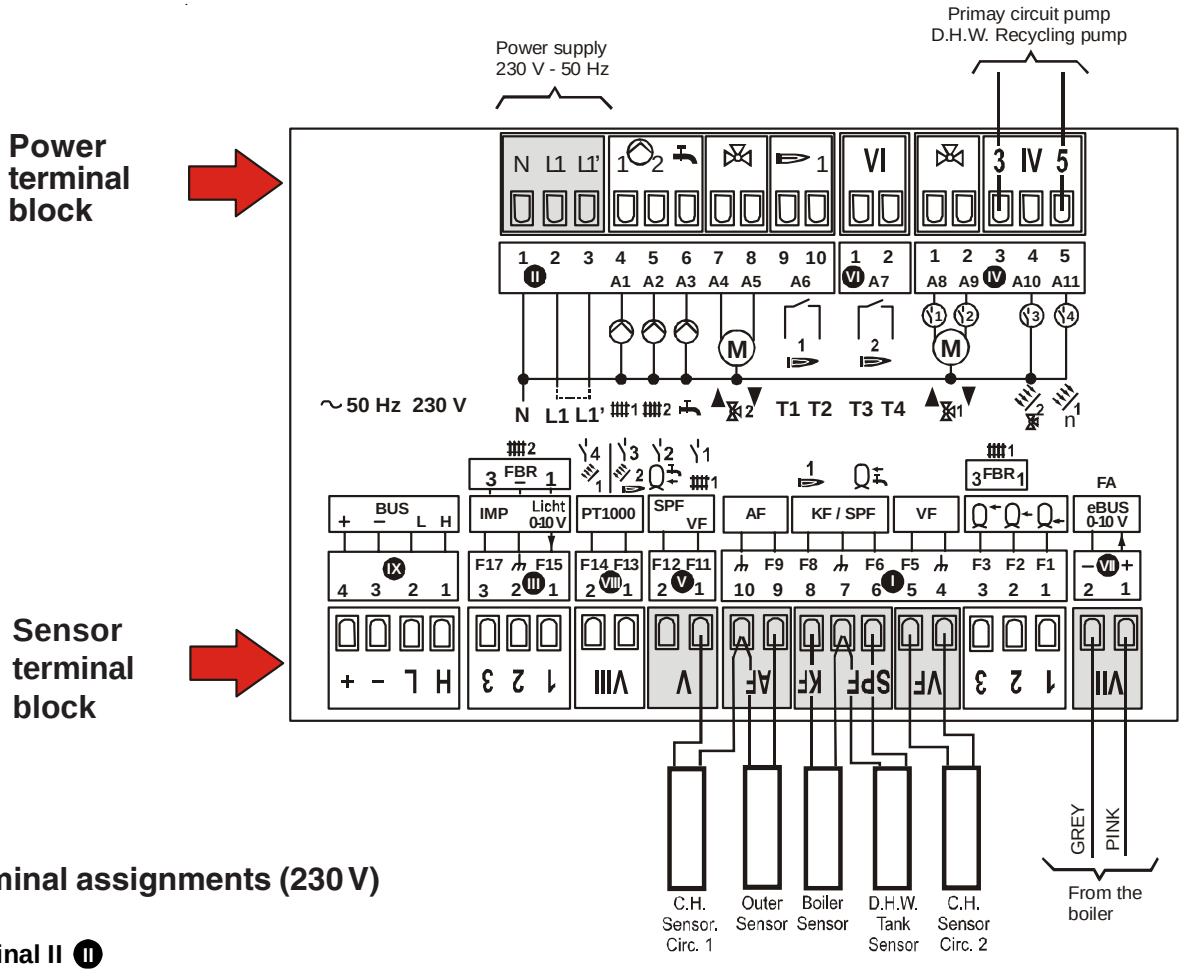
Modulating pump (optional cod. 00361320 ALKON 50)



3.19 - WIRING DIAGRAM AND MANAGEMENT WITH E8 REGULATOR (Optional)

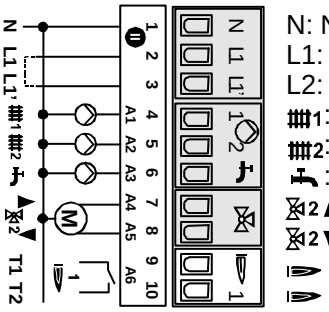
On the back side of the E8 regulator there are two terminal blocks, of which one is for the mains (230 V) connections and the other one is for the low tension connections.

The main controls, necessary for the C.H. system management and for the boiler control, as well some components which are part of the boiler house, must be connected to the terminal blocks.



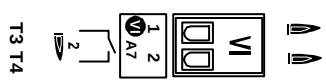
Power terminal assignments (230 V)

Terminal II (II)

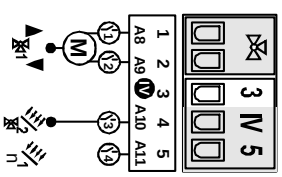


N: Neutral conductor, mains
L1: Power supply, unit
L2: Power supply to relay
1: heating circuit pump HK 1
2: heating circuit pump HK 2
: Storage tank charging pump
2▲: Mixer open, heating circuit 2
2▼: Mixer closed, heating circuit 2

Terminal VI (VI)



Terminal IV (IV)

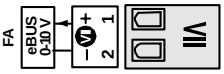


1▲ : Mixer open, heating circuit 1 1
1▼ : Mixer closed, heating circuit 1 2

Multifunction relay 3
Recycle pump / Multifunction relay 4

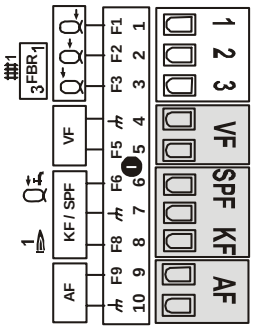
Sensor terminal assignments

Terminal VII (VII) **Connection to BCM**



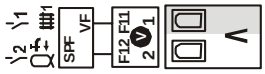
Pin 1: eBUS (FA) or 0-10V output
Pin 2: (Ground)

Terminal I (I)



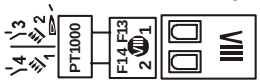
Buffer storage tank low sensor
Buf. stor. tank middle sensor / FBR heat. circ. 1 (room sensor)
Buf. stor. tank top sensor / FBR heat. circ. 1 (set value)
VF Pin 4: Flow sensor, heating circuit 2 (ground)
VF Pin 5: Flow sensor, heating circuit 2
SPF Pin 6: D.H.W. Storage tank sensor
SPF Pin 7: Storage tank and boiler sensor (ground)
KF Pin 8: Boiler sensor
AF Pin 9: Outdoor sensor
AF Pin 10: Outdoor sensor (ground)

Terminal V (V)



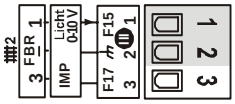
VF Pin 1: C.H. Flow sensor circuit 1 / sensor Multifunction 1
SPF Pin 2: D.H.W. Tank low sensor / sensor Multifunction 2

Terminal VIII (VIII)



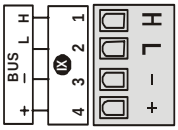
F13 Pin 1: Solar sensor 2 / Sensor Multifunction relay 3
F14 Pin 2: Solar sensor 1 / Sensor multifunction relay 4

Terminal III (III)



F15 Pin 1: FBR heating circuit 2 (room sensor) / 0-10V IN / (to be enabled)
Pin 2: FBR heating circuit 2 (ground)
F17 Pin 3: FBR heating circuit 2 (set value) / Pulse counter for

Morsetto IX (IX) **For connection to remote control devices**



H CAN Bus Pin 1 = H (Data communication)
L CAN Bus Pin 2 = L (Data communication)
- CAN Bus Pin 3 = - (ground, Gnd)
+ CAN Bus Pin 4 = + (12V supply)

3.20 - INSTALLATION EXAMPLES (functional wiring and connections description)

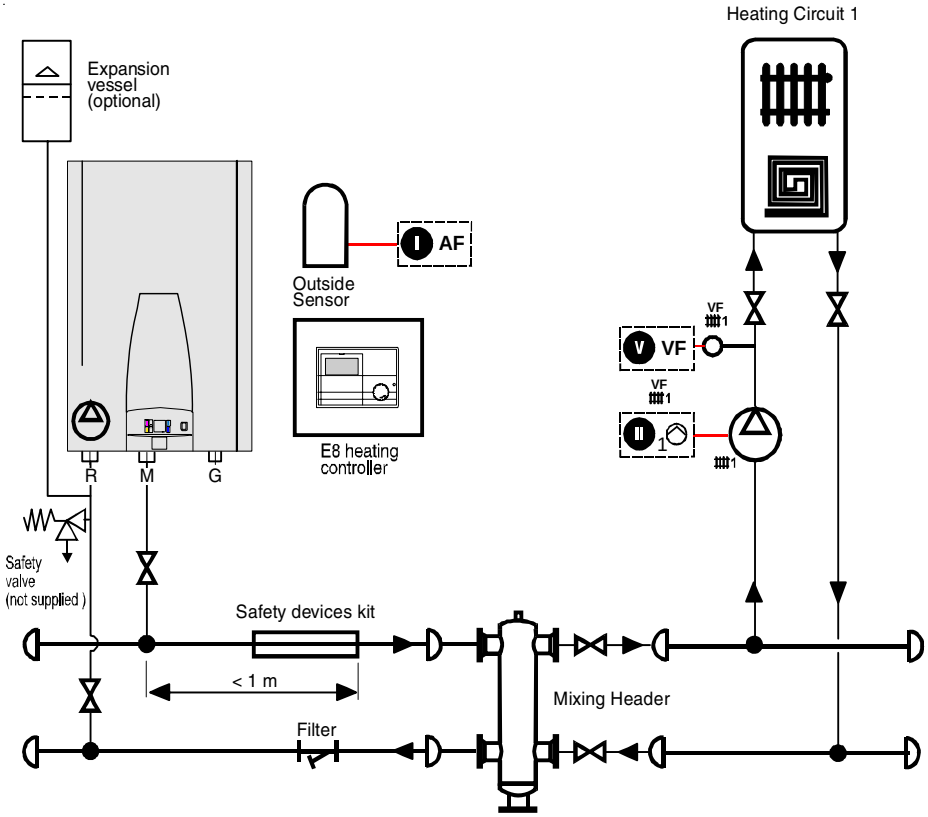
INSTALLATION OF A BOILER WITH CONNECTION TO A DIRECT HEATING ZONE

I **AF** (9-10) outdoor sensor

IV (4) Collector pump

V VF 1 (1) Flow sensor heating circuit 1

I 10 (10) Ground outdoor sensor



NOTE!
THE CONFIGURATIONS, SHOWN IN THIS MANUAL, ARE DOABLE BY USING THE E8 REGULATOR, SUPPLIED AS AN OPTION.

BEFORE USING OTHER MODELS OF REGULATORS, MAKE SURE THEY ARE COMPATIBLE

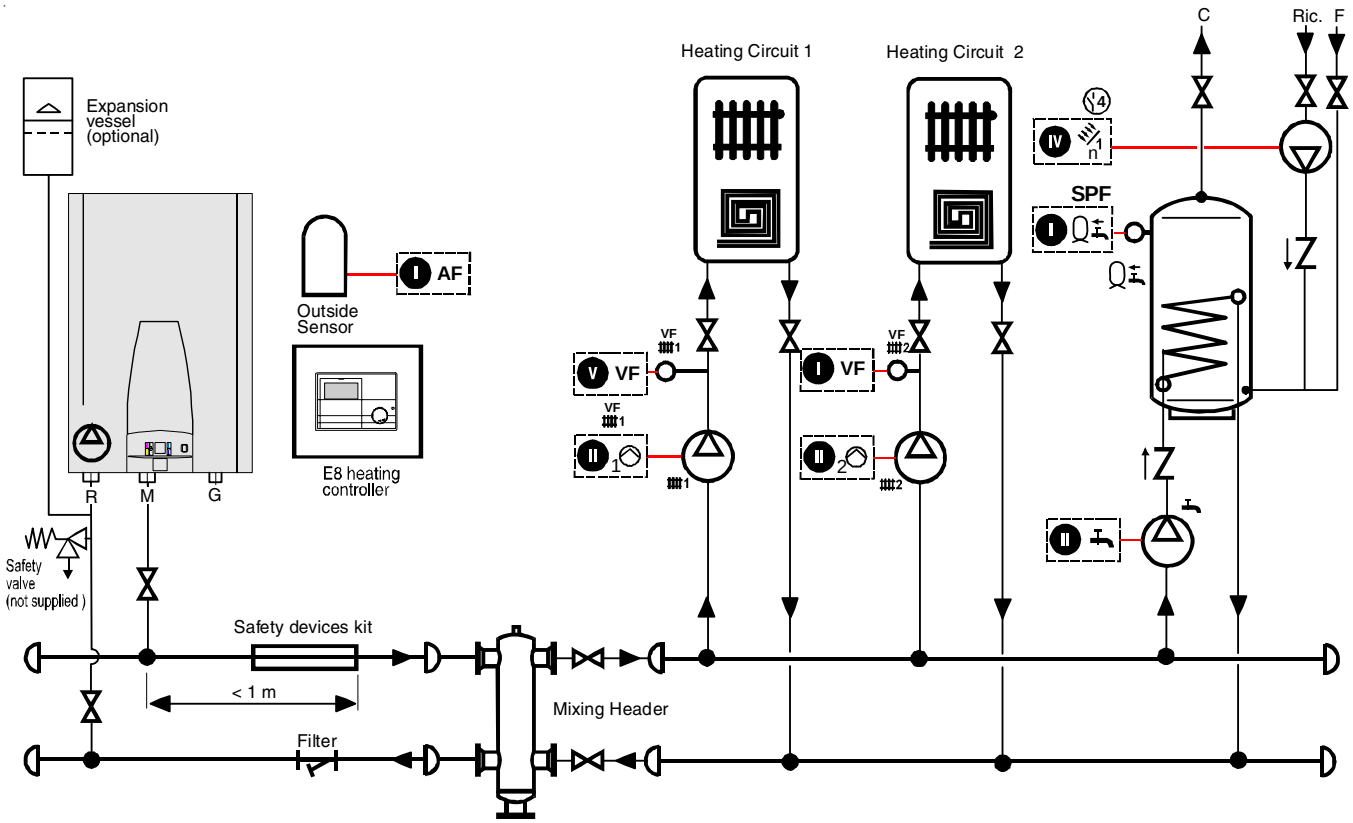
INSTALLATION OF A BOILER WITH CONNECTION TO TWO DIRECT HEATING ZONES + D.H.W. PRODUCTION

I VF 2 (4-5) Flow sensor heating circuit 2
SPF (6-7) Storage tank sensor
AF (9-10) outdoor sensor

II 1 (4) Pump heating circuit 1
2 (5) Pump heating circuit 2
(6) Cylinder charging pump

IV n 1 (5) Re-circulation pump storage tank

V VF 1 (1) Flow sensor heating circuit 1
I 10 (10) Ground outdoor sensor



Instructions for the installer

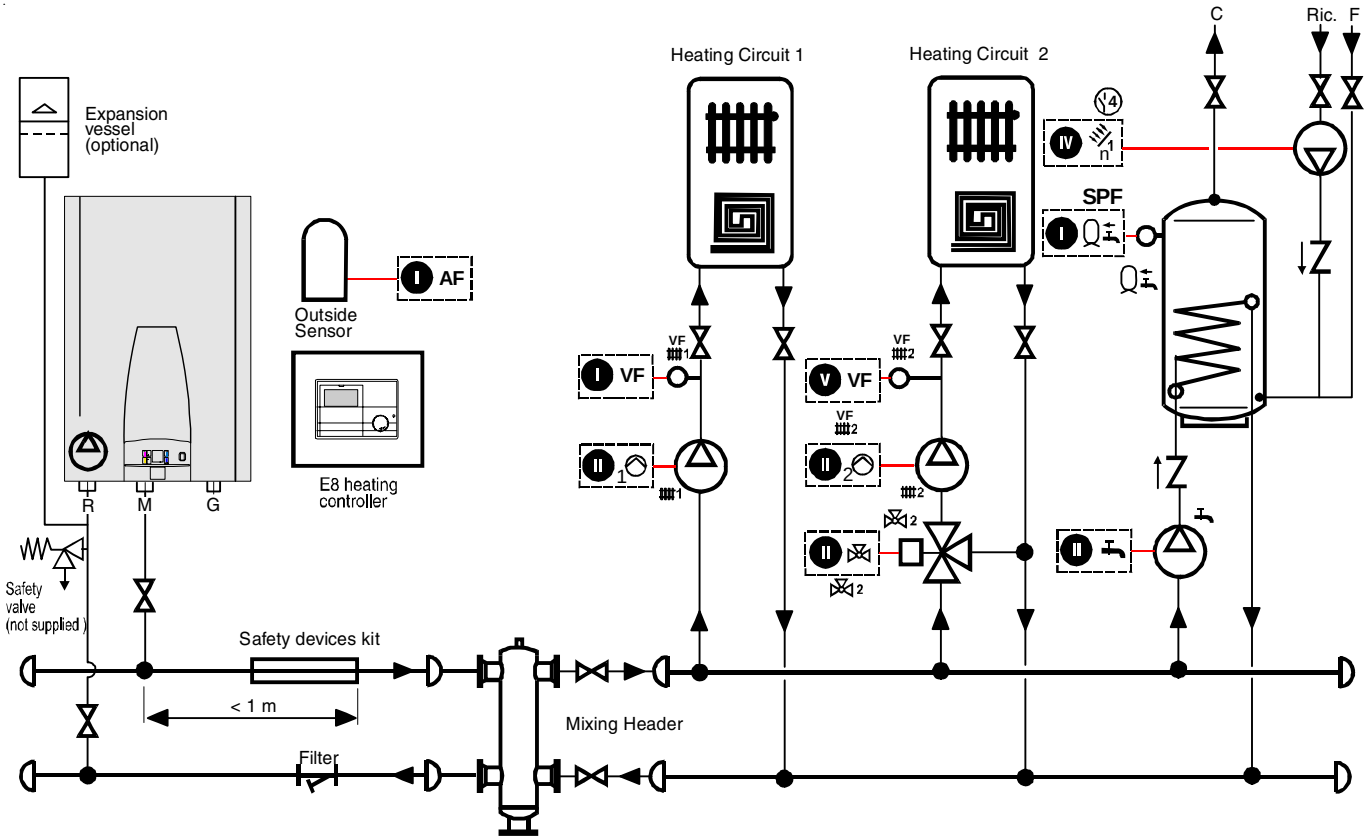
INSTALLATION OF A BOILER WITH CONNECTION TO ONE MIXED AND ONE DIRECT HEATING ZONES + D.H.W. PRODUC.

I VF 2 (4-5) Flow sensor heating circuit 2
SPF (6-7) Storage tank sensor
AF (9-10) outdoor sensor

II 1 (4) Pump heating circuit 1
2 (5) Pump heating circuit 2
(6) Cylinder charging pump
2

IV n 1 (5) Re-circulation pump storage tank

V VF 1 (1) Flow sensor heating circuit 1
I 10 (10) Ground outdoor sensor



INSTALLATION OF A BOILER WITH CONNECTION TO TWO MIXED ZONES + D.H.W. PRODUCTION

I VF 2 (4-5) Flow sensor heating circuit 2
SPF (6-7) Storage tank sensor
AF (9-10) outdoor sensor

V VF 1 (1) Flow sensor heating circuit 1
I 10 (10) Ground outdoor sensor

II 1 (4) Pump heating circuit 1
2 (5) Pump heating circuit 2
(6) Cylinder charging pump

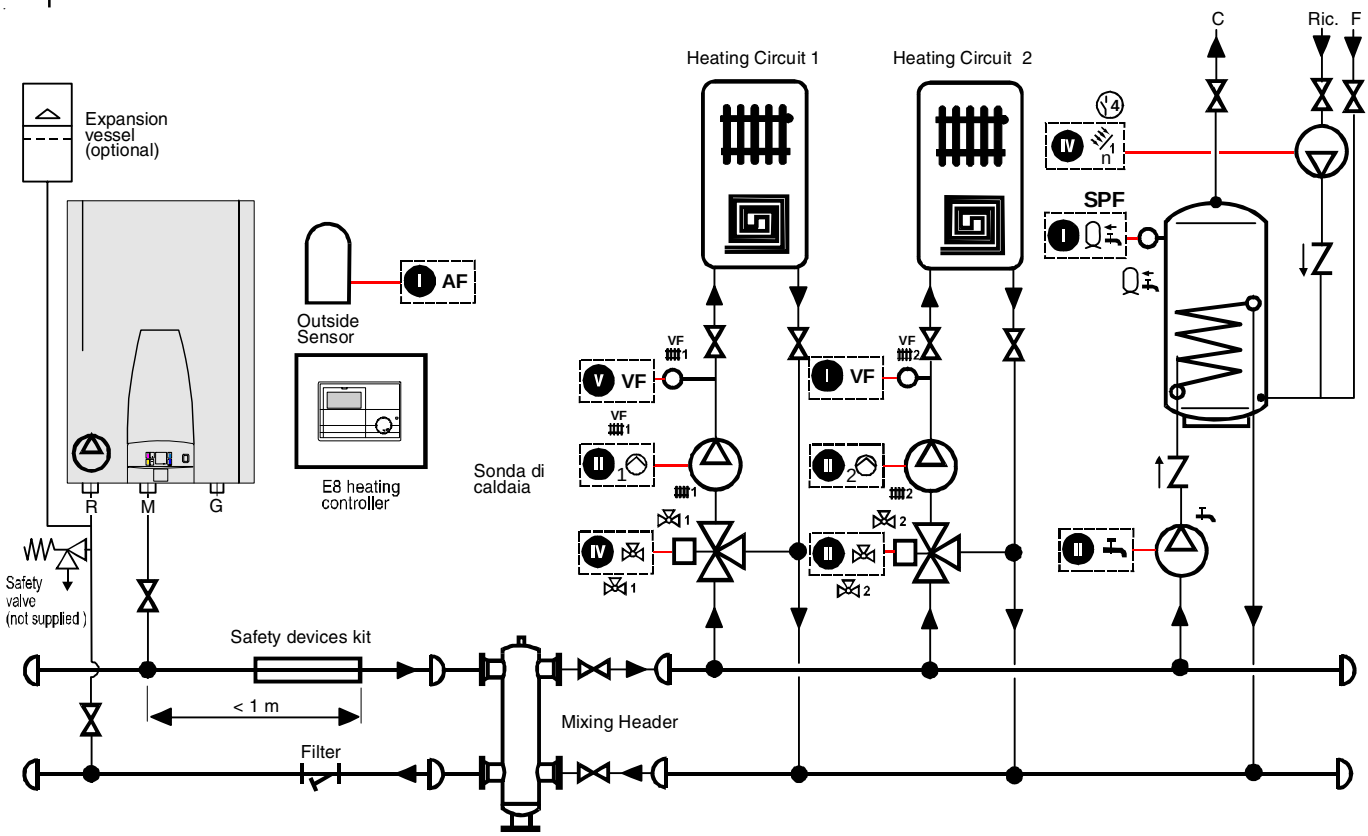
2 (7) Mixer motor heating circuit 2 OPEN
(8) Mixer motor heating circuit 2 CLOSE

IV 1 (1) Mixer motor heating circuit 1 OPEN
(2) Mixer motor heating circuit 1CLOSE

IV 1 n (5) Re-circulation pump storage tank

V 2 (2) Hot water tank low / Multifunction relay sensor 2

PT1000
VIII 4 1 (2) PT1000 sensor solar 1 / Multifunction relay sensor 4



Instructions for the installer

INSTALLATION OF A BOILER WITH CONNECTION TO TWO MIXED ZONES + D.H.W. PRODUCTION BY SOLAR PANELS

I VF 2 (4-5) Flow sensor heating circuit 2
SPF (6-7) Storage tank sensor
AF (9-10) outdoor sensor

II 1 (4) Pump heating circuit 1
2 (5) Pump heating circuit 2
(6) Cylinder charging pump

2 (7) Mixer motor heating circuit 2 OPEN
(8) Mixer motor heating circuit 2 CLOSE

IV 1 (1) Mixer motor heating circuit 1 OPEN
(2) Mixer motor heating circuit 1CLOSE

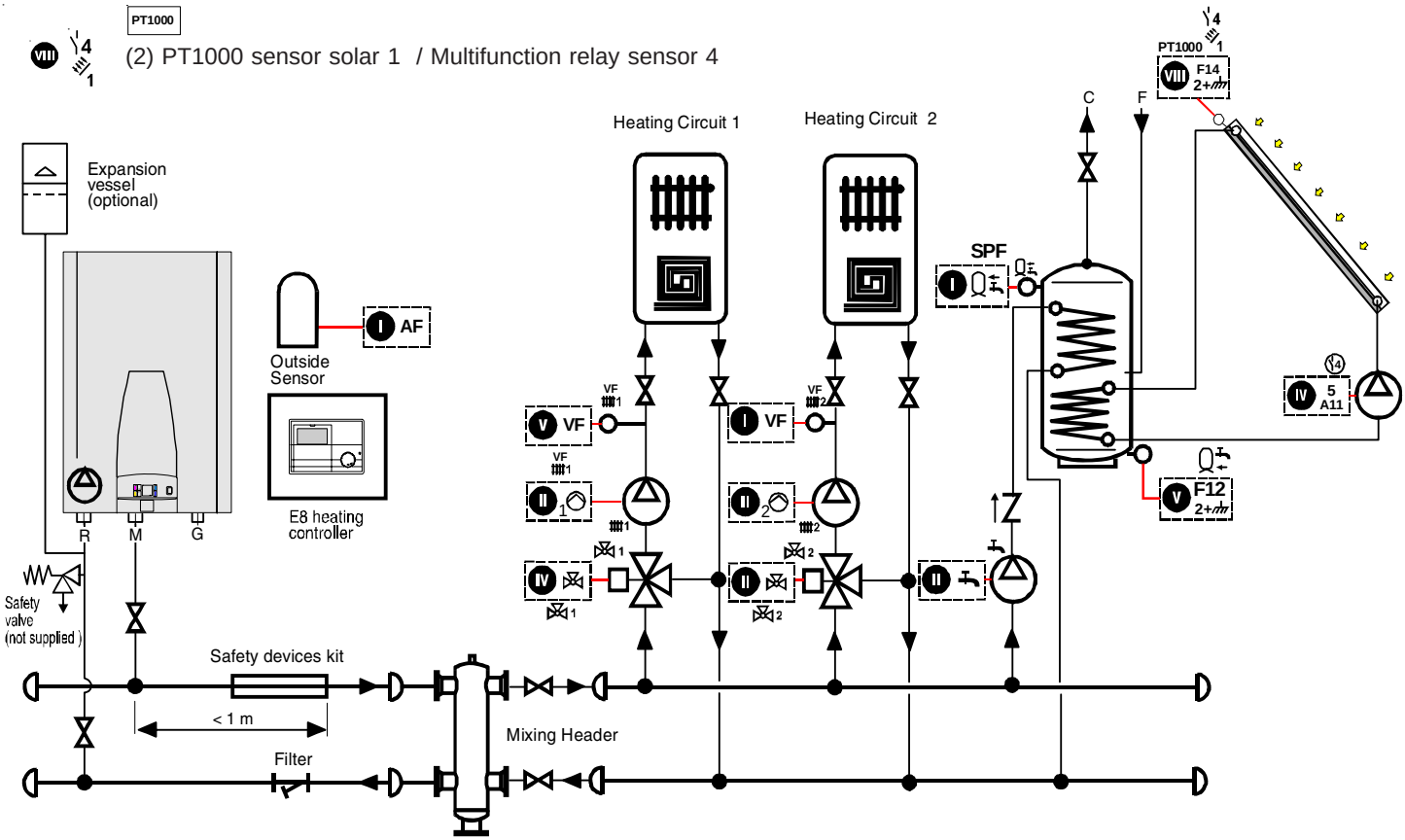
n 1 (5) Re-circulation pump storage tank

2 (4) Collector pump

V 2 (2) Hot water tank low / Multifunction relay sensor 2

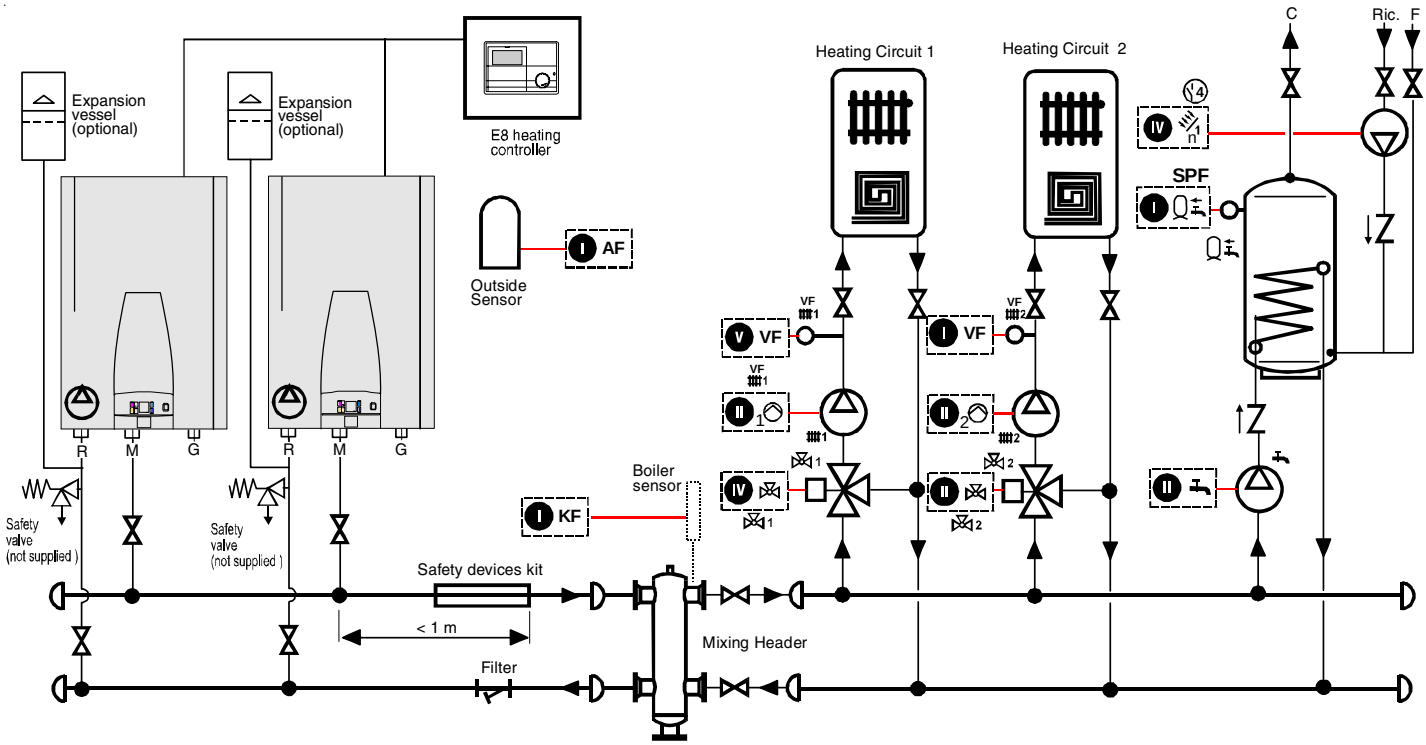
V VF 1 (1) Flow sensor heating circuit 1
I 10 (10) Ground outdoor sensor

PT1000
VIII 4 1 (2) PT1000 sensor solar 1 / Multifunction relay sensor 4



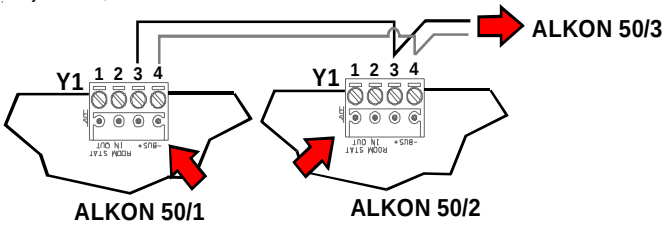
For the connection to a solar installation it is necessary to change some parameters. See Table:
Expert AREA ⇒ Level SOLAR / MF ⇒ MF 4
FUNCTION = ‘’23’’

INSTALLATION OF A BOILER WITH CONNECTION TO TWO MIXED ZONES + D.H.W. PRODUCTION



Connection of severa ALKON 50 o 70

The electrical connection of several ALKON 50 in cascade must be done in parallel between the terminals **3 of Y1 (ALKON 50 or 70 / 1)** e **3 of Y1 (ALKON 50 or 70 / 2)** ....etc; from **4 of Y1 (ALKON 50 or 70 / 1)** al **4 di Y1 (ALKON 50 or 70 / 2)** ....etc, **of the PCBs** .



Attention!
Respect the polarity: BUS - / BUS -
BUS + / BUS +

The E8 regulator (OPTIONAL) will recognise automatically the number of boilers connected and their output .

For the connection of several ALKON 90 (Max 8 boilers) it is necessary to change some parameters of prearrangement (see table Regulator E8 on page 6:
TIPE CR1 from "2" to "6"
CR1 BUS prearranged "03"

Set the E8 in cascade System (see ***Input of the basic setting***, parameter list **cascade**)
Set the parameter SC in the ALKON 50:
1st master ((sc = 00), 2nd slave (sc = 01),
3rd slave (sc = 02), 4th slave (sc = 03)

Connections on to the MASTER controller

The connections of the secondary circuit have to be done on to the MASTER controller.

I VF 2 (4-5) Flow sensor heating circuit 2
SPF (6-7) Storage tank sensor
AF (9-10) outdoor sensor

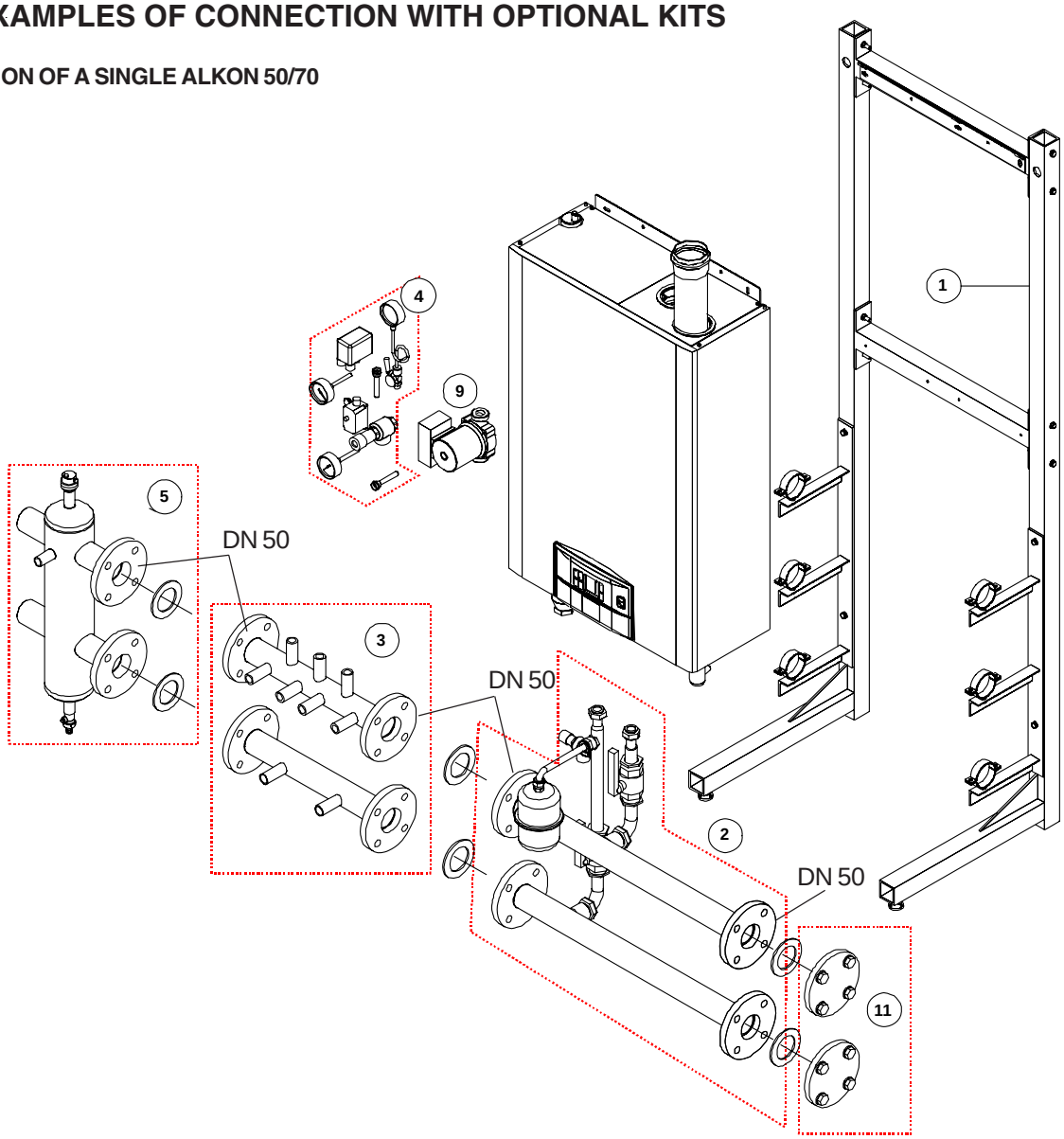
II 1 (4) Pump heating circuit 1
2 (5) Pump heating circuit 2
(6) Cylinder charging pump
2 (7) Mixer motor heating circuit 2 OPEN
(8) Mixer motor heating circuit 2 CLOSE

IV 1 (1) Mixer motor heating circuit 1 OPEN
(2) Mixer motor heating circuit 1CLOSE
1 n (5) Re-circulation pump storage tank
2 (4) Collector pump

V VF 1 (1) Flow sensor heating circuit 1
I 10 (10) Ground outdoor sensor

3.21 - EXAMPLES OF CONNECTION WITH OPTIONAL KITS

INSTALLATION OF A SINGLE ALKON 50/70



1 - 00361366 = Supporting frame for one boiler
2 - 00361314 = Manifold kit for Alkon 50/70
3 - 00361313 = Pipe kit for additional safety devices
4 - 00361316 = Safety devices kit
5 - 00361333 = Mixing bottle kit
9 - 00361320 = Modulating pump (only for Alkon 50)
- 00361321 = Constant flow rate pump (only for Alkon 50)
11 - 00361450 = Blind flanges kit

REGULATION ACCESSORIES

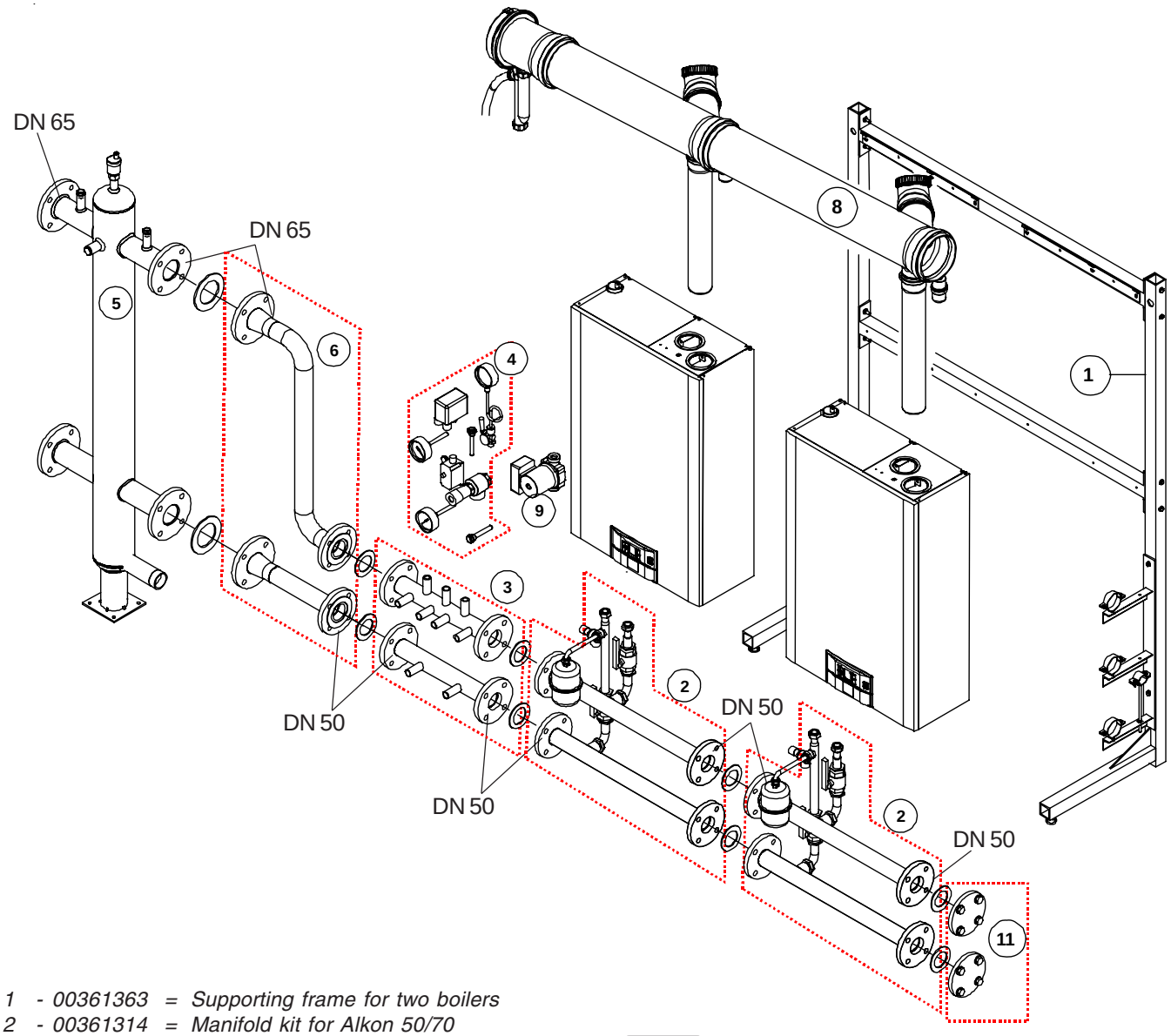
00361332 = E8 regulator kit
00361359 = Box for E8 regulator kit
00361358 = BM8 remote control kit

1 - 00361366 = Supporting frame for one boiler
2 - 00361314 =
3 - 00361313 =
4 - 00361316 =
5 - 00361333 =
9 - 00361320 = Modulating pump (only for Alkon 50)
- 00361321 = Constant flow rate pump (only for Alkon 50)
11 - 00361450 = Blind flanges kit

CONNECTION OF AN EXTERNAL D.H.W. TANK

00361668 = Kit of electrical wiring for an ext. D.H.W. tank for ALKON 50
00361736 = Kit of electrical wiring for an ext. D.H.W. tank for ALKON 70

INSTALLATION OF TWO ALKON 50/70 IN BATTERY



1 - 00361363 = Supporting frame for two boilers
2 - 00361314 = Manifold kit for Alkon 50/70
3 - 00361313 = Pipe kit for additional safety devices
4 - 00361316 = Safety devices kit
5 - 00361499 = Mixing bottle kit
6 - 00361414 = Pipes kit for connection of mixing bottle
8 - 00361361 = Smoke outlet for two boilers
9 - 00361320 = Modulating pump (only for Alkon 50)
- 00361321 = Constant flow rate pump (only for Alkon 50)
11 - 00361450 = Blind flanges kit

SMOKE ACCESSORIES

00262430 = Elbow 45° Ø 160
00262431 = Elbow 87° Ø 160
00262432 = Extension Ø 160 L = 250
00262433 = Extension Ø 160 L = 500
00262434 = Extension Ø 160 L = 1000
00262435 = Extension Ø 160 L = 2000
00262438 = Inspection terminal Ø 160

Note:
The insulation of the battery flow and return manifolds is suggested.

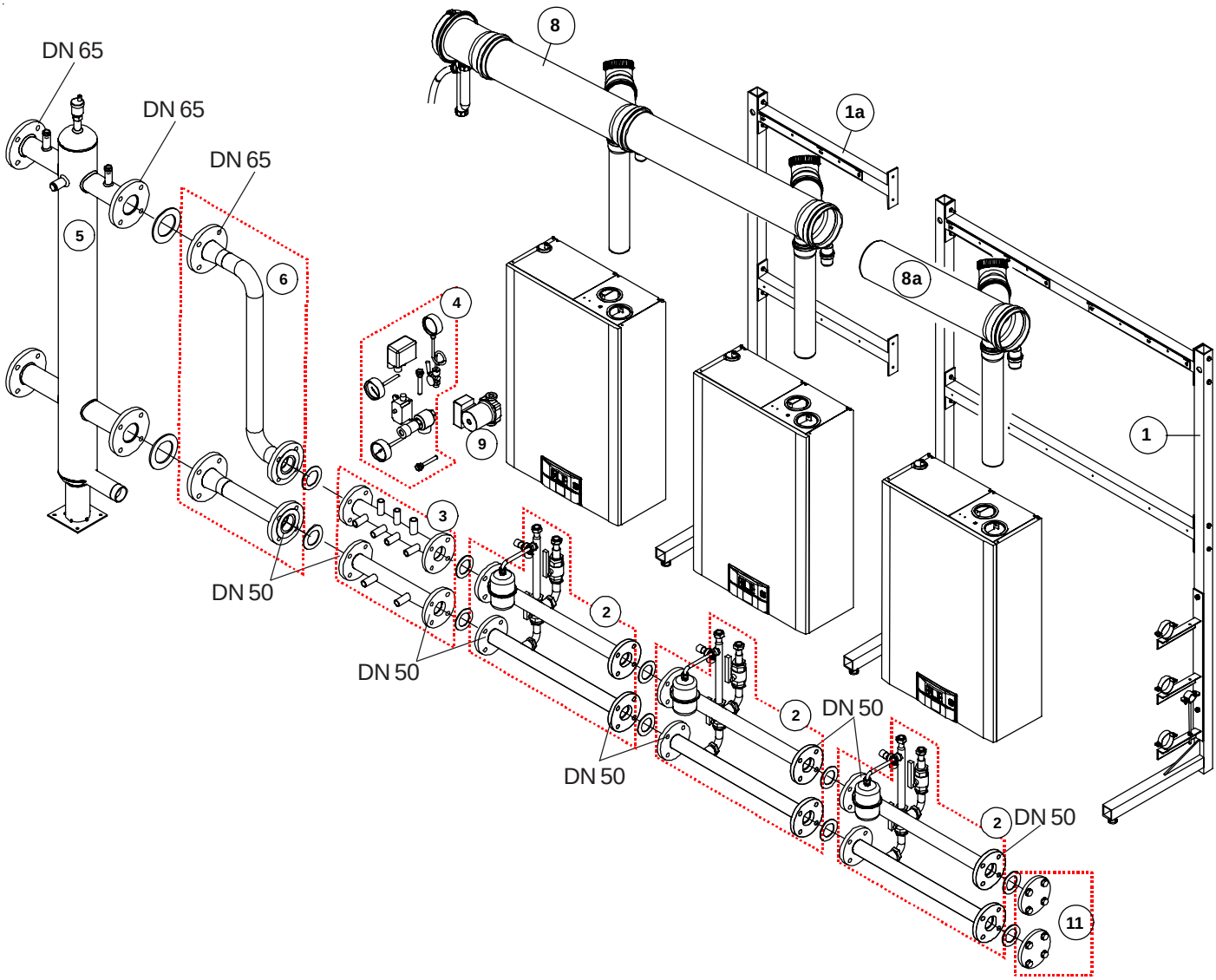
REGULATION ACCESSORIES

00361332 = E8 regulator kit
00361359 = Box for E8 regulator kit
00361358 = BM8 remote control kit

CONNECTION OF AN EXTERNAL D.H.W. TANK

00361668 = Kit of electrical wiring for an ext. D.H.W. tank for ALKON 50
00361736 = Kit of electrical wiring for an ext. D.H.W. tank for ALKON 70

INSTALLATION OF THREE ALKON 50/70 IN BATTERY



1 - 00361363 = Supporting frame for two boilers
1a - 00361365 = Added supporting frame for one boiler
2 - 00361314 = Manifold kit for Alkon 50/70
3 - 00361313 = Pipe kit for additional safety devices
4 - 00361316 = Safety devices kit
5 - 00361499 = Mixing bottle kit
6 - 00361414 = Pipes kit for connection of mixing bottle
8 - 00361361 = Smoke outlet for two boilers Alkon
8a - 00361362 = Added smoke outlet for one boiler Alkon 50
9 - 00361320 = Modulating pump (only for Alkon 50)
- 00361321 = Constant flow rate pump (only for Alkon 50)
10 - 00361450 = Blind flanges kit

SMOKE ACCESSORIES

00262430 = Elbow 45° ø160
00262431 = Elbow 87° Ø 160
00262432 = Extension Ø 160 L = 250
00262433 = Extension Ø 160 L = 500
00262434 = Extension Ø 160 L = 1000
00262435 = Extension Ø 160 L = 2000
00262438 = Inspection terminal Ø 160

Note:
The insulation of the battery flow and return manifolds is suggested.

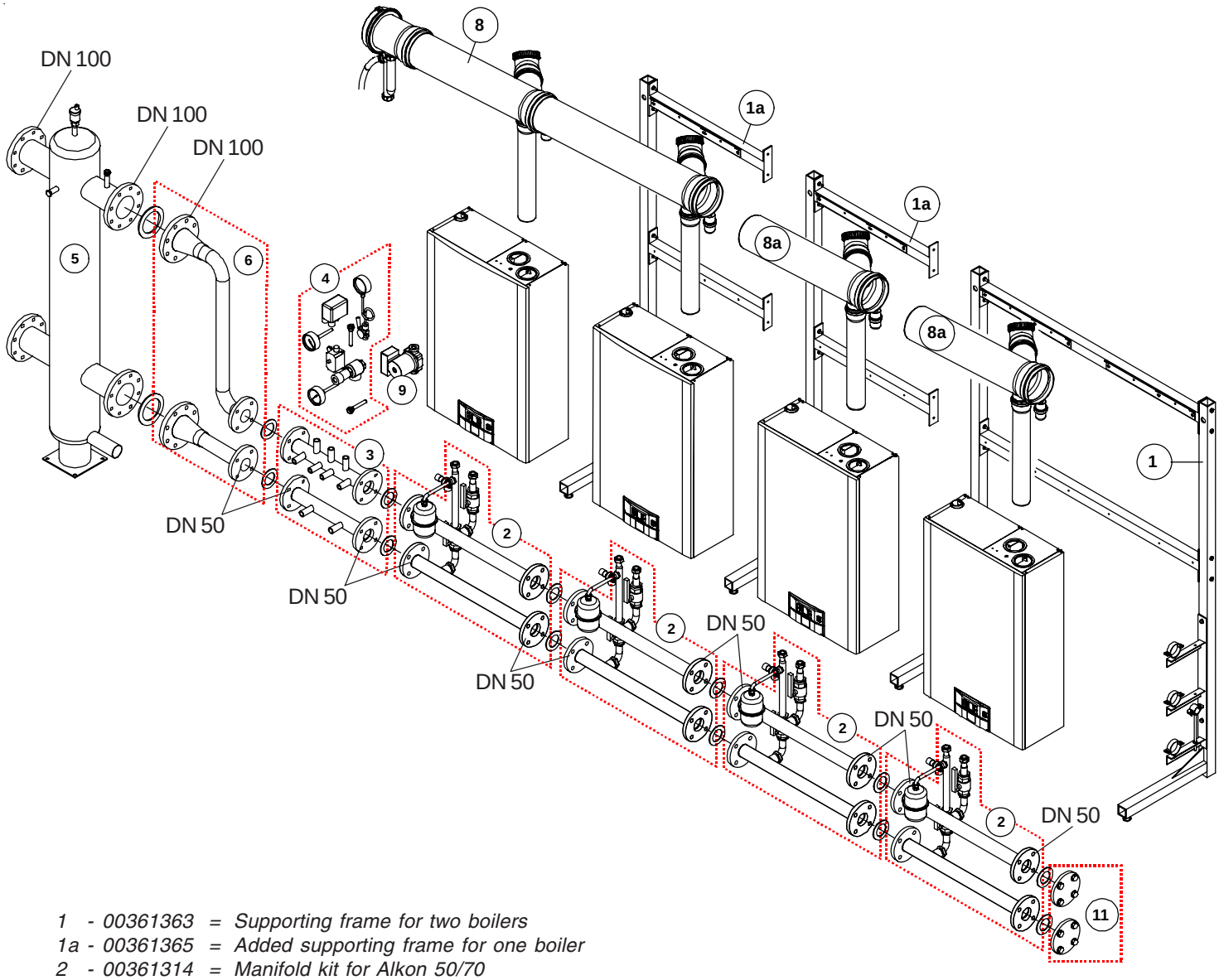
EGULATION ACCESSORIES

00361332 = E8 regulator kit
00361359 = Box for E8 regulator kit
00361358 = BM8 remote control kit

CONNECTION OF AN EXTERNAL D.H.W. TANK

00361668 = Kit of electrical wiring for an ext. D.H.W. tank for ALKON 50
00361736 = Kit of electrical wiring for an ext. D.H.W. tank for ALKON 70

INSTALLATION OF FOUR ALKON 50/70 IN BATTERY



1 - 00361363 = Supporting frame for two boilers
1a - 00361365 = Added supporting frame for one boiler
2 - 00361314 = Manifold kit for Alkon 50/70
3 - 00361313 = Pipe kit for additional safety devices
4 - 00361316 = Safety devices kit
5 - 00361500 = Mixing bottle kit
6 - 00361415 = Pipes kit for connection of mixing bottle
8 - 00361361 = Smoke outlet for two boilers
8a - 00361362 = Added smoke outlet for one boiler Alkon 50
9 - 00361320 = Modulating pump (only for Alkon 50)
- 00361321 = Constant flow rate pump (only for Alkon 50)
11 - 00361450 = Blind flanges kit

SMOKE ACCESSORIES

00262430 = Elbow 45° ø 160
00262431 = Elbow 87° Ø 160
00262432 = Extension Ø 160 L = 250
00262433 = Extension Ø 160 L = 500
00262434 = Extension Ø 160 L = 1000
00262435 = Extension Ø 160 L = 2000
00262438 = Inspection terminal Ø 160

Note:
The insulation of the battery flow and return manifolds is suggested.

REGULATION ACCESSORIES

00361332 = E8 regulator kit
00361359 = Box for E8 regulator kit
00361358 = BM8 remote control kit

CONNECTION OF AN EXTERNAL D.H.W. TANK

00361668 = Kit of electrical wiring for an ext. D.H.W. tank for ALKON 50
00361736 = Kit of electrical wiring for an ext. D.H.W. tank for ALKON 70

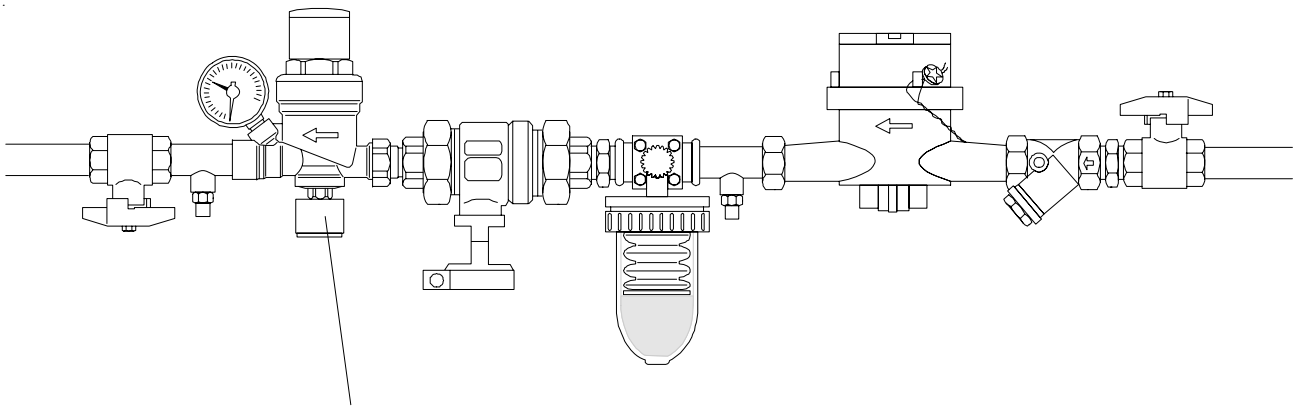
3.22 - FILLING THE SYSTEM

Warning!
Do not mix the CH system's water with anti-freeze or anti-corrosion solutions using wrong concentrations! It could cause damage to the washers and could provoke noise during normal boiler operation.
UNICAL refuses all liability for injury to persons, animals or damage to property deriving from not having respected the above mentioned recommendations.

Once all the connections are made, it is possible to fill the circuit.
This operation has to be performed very carefully, by observing the following steps (boiler in Off position):

- open the radiator bleeds and make ascertain the good operation of the automatic air vent fitted in the boiler .
- open progressively the filling valve and make sure the automatic air vent, in the system, work properly.
- close the bleeders of the radiators when water starts to come out.
- control via the manometer (bargraph) that the water pressure has reached a minimum value of 0.8/1 bar.
- close the filling valve and bleed again all the radiators.
- inspect for the soundness all the hydraulic connections.
- after the commissioning of the boiler and the reaching of the normal operation temperature, switch off the operation of the boiler and the pump and repeate the bleed operation.
- let the installation cool down and, if necessary, add water in order to reach the minimum presure of 0.8/1 bar.

EXAMPLE OF FILLING-UP SYSTEM MANIFOLD



Filling group

3.23 - INITIAL LIGHTING

PRELIMIARY CHECKS

The first ignition must be carried out by a qualified technician. Failure to do so could cause injury to persons, animals or damage to property. UNICAL shall not be held liable for any injury and/or damage.

Before lighting the boiler check that:

- the boiler installation has been carried out in accordance with the specific Standards and regulations in force for the gas part and for the electrical part;
- the air supply and the discharge of the products of combustion are carried out in the correct way in accordance to the specific Standards and regulations in force;
- the gas supply system is correctly dimensioned for the boiler's output and is fitted with all the safety and control devices prescribed by the regulations in force;
- the electrical supply must be 230 V - 50 Hz;
- the system has been filled with water (pressure registered on the gauge 0,8/1 bar with pump not running);
- any on-off valves of the system are open;
- the mains supply gas corresponds to the one which the boiler has been calibrated for: otherwise convert the boiler to use the available gas (refer to section: "GAS CONVERSION"); this operation must be carried out by a qualified technician in compliance to the regulations in force;
- the gas supply cock is open;
- there are no gas leaks;
- the external mains supply switch is on;
- the system's safety valve on the boiler is not blocked and that it is connected to the sewage system;
- the condensate drain siphon has been filled with water;

DANGER!
Before firing the appliance fill up the siphon through the filling hole and check the correct drainage of the condensate.
If the appliance is used with the condensate drain siphon empty this could lead to danger of

- there are no water leaks;
- all the necessary ventilation conditions and minimum clearance distances are guaranteed for subsequent servicing.

LIGHTING AND SHUTTING DOWN PROCEDURES

For lighting and shutting down the boiler refer to the "INSTRUCTIONS GUIDE FOR THE PERSON IN CHARGE OF THE APPLIANCE"

Information to be passed on to the user.

The usert be instructed on the use and operation of the boiler and in particular:

- Hand the booklet: "USER'S OPERATING INSTRUCTIONS", as well as all the other literature relative to the appliance, and placed in the envelope contained in the packaging, to the user.
The user must retain this literature for any future reference.

- Inform the user of the importance of the air vents and of the flue outlet system, stressing the fact that absolutely no modification can be made.

- Inform theuser regarding the control of the system water pressure and how to restore it to the correct value.

- Explain and demonstrate to the user the correct function and adjustment of the temperature, thermostats and radiators for the economic use of the system.

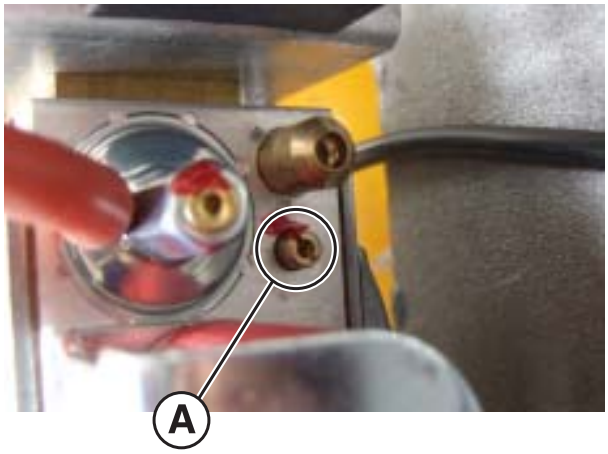
- Remind the user that a comprehensive service and the measurement of thecombustion efficiency should be carried out regularly (as requested by the national law).

- If the appliance is sold or transferred to another owner or if the present user moves home and leaves the appliance installed, ensure yourself that the manual always follows the appliance so that it can be consulted by the new owner and/or installer.

3.24 - BURNER ADJUSTMENT

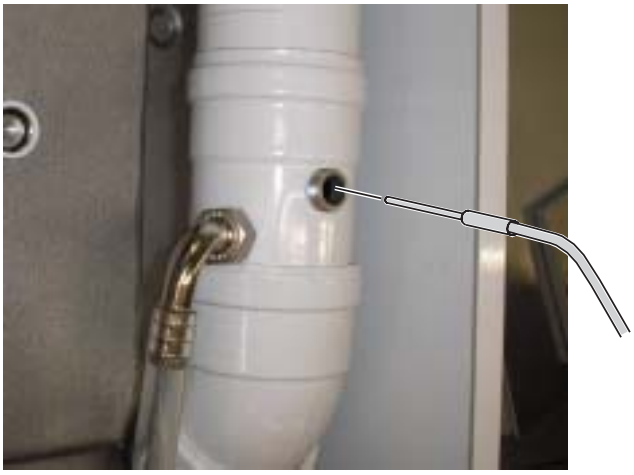
WARNING!
All the instructions indicated below are for the exclusive use of qualified UNICAL service technicians or installers.

All the boilers are supplied already calibrated and tested. If it is necessary to change the calibration due to gas conversion or adaptation to the mains supply system, the gas valve must be re-calibrated.

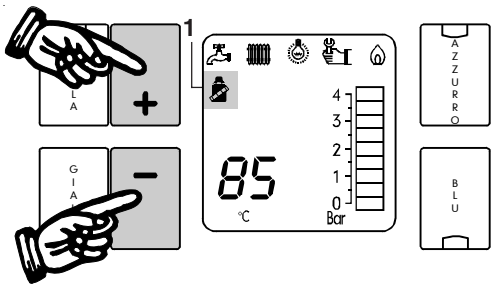


A) Max output adjustment

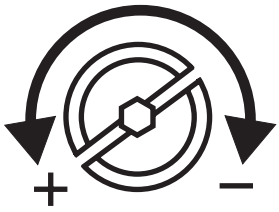
- Connect a suitable $C0_2$ gas analyser to the sampling point in the flue inlet/outlet terminal.



- Pressing simultaneously the keys **+** (**plus**) and – (**minus**) for at least 3 seconds the boiler will operate in the CH mode at the maximum output (led 1 illuminated).



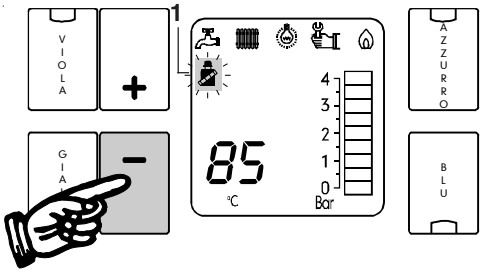
- Check that the $C0_2$ values are within the values indicated in the table “Burner pressures”
- If necessary correct the value by turning the adjustment screw “A” in a CLOCKWISE direction to decrease the value and in an ANTICLOCKWISE direction in order to increase it.



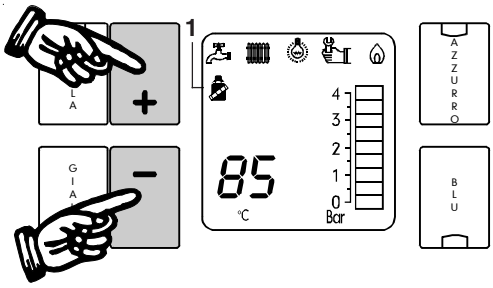
MAXIMUM OUTPUT ADJUSTMENT SCREW (**A**)

B) Min output adjustment

- By pressing the key “- decrease” again the boiler will operate at the minimum output (led 1 blinking).

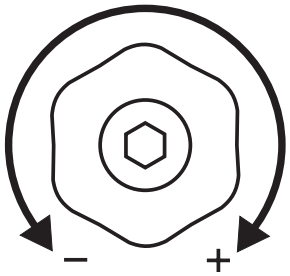


-To disenable the **CHIMNEY SWEEPER MODE** press the keys + (increase) and – (decrease) simultaneously (led 1 off).



- Check that the $C0_2$ values are within the values indicated in the table “Burner pressures”

- If necessary correct the value by turning the adjustment screw “B” in a CLOCKWISE direction to increase the value and in an ANTICLOCKWISE direction in order to decrease it.



MINIMUM OUTPUT ADJUSTMENT SCREW (**B**)

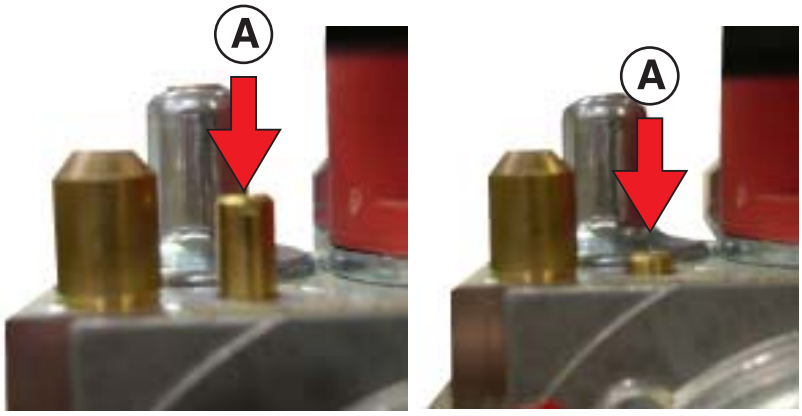
C) COMPLETION OF THE BASIC ADJUSTMENTS

- Check the $C0_2$ values at the minimum and maximum outlet
- If necessary make the required adjustments

To ensure correct operation the $C0_2$ values have to be adjusted with extreme care respecting the values indicated in the table.

- Close the sampling test point in the flue inlet/outlet terminal with the appropriate cap C.

Tighten the maximum adjustment screw “A” in a clockwise direction until you arrive to the abutting end, than slacken for 7 turns.
Verify the boiler ignition; if the boiler goes into lockout slacken the screw “A” again of one turn, than retry the ignition. If the boiler goes into lockout again, carry out the above indicated operations until the boiler is lighted.
At this point carry out the burner adjustment as previously indicated.



INJECTORS – PRESSURES

Check the $C0_2$ levels often, especially at low flow rate

ALKON 50

Gas Type	Supply pressure (mbar)	Heat input (kW)	Collector Diaphragm (Ø and n° holes)	$C0_2$ levels (%) min	$C0_2$ levels (%) max	Fan speed % FL (min)	Fan speed % FH (max)	Mixer injectors (Ø mm)	Flue outlet diaphragm (Ø mm)	Min. gas consumption	Max gas consumption	Start output %
Nat. Gas (G20)	20	48,5-9,6	-	9,5	9,5	26	95	5,6	-	1,02 m³/h	5,13 m³/h	40
LPG (G31)	37	48,5-9,6	-	11,0	11,0	24	92	5,6	-	0,75 kg/h	3,76 kg/h	45

ALKON 70

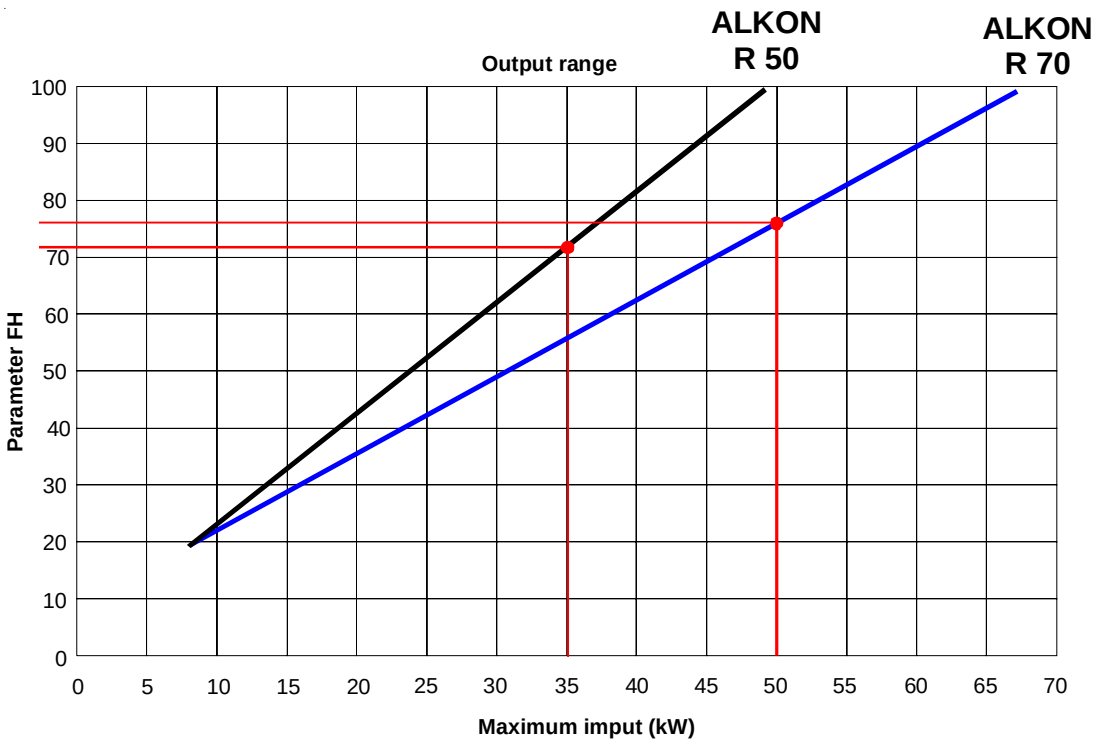
Gas Type	Supply pressure (mbar)	Heat input (kW)	Collector Diaphragm (Ø and n° holes)	$C0_2$ levels (%) min	$C0_2$ levels (%) max	Fan speed % FL (min)	Fan speed % FH (max)	Mixer injectors (Ø mm)	Flue outlet diaphragm (Ø mm)	Min. gas consumption	Max gas consumption	Start output %
Nat. Gas (G20)	20	67,5-9,6	-	9,5	9,5	20	99	9,0	-	1,02 m³/h	7,14 m³/h	50
LPG (G31)	37	67,5-9,6	-	11,0	11,0	20	90	9,0	-	0,75 kg/h	5,24 kg/h	60

FL e FH = parameter

3.25 - VARIATION OF OUTPUT RANGE

It is possible to adjust the maximum input by reducing the fan speed.
Modify the parameter FH from the boiler panel board:

Factory parameter (access code)
For example: ALKON 50 with parameter FH set on **72 (G 20)** the correspondent maximum input will be of **34,8 kW.**
For example: ALKON 70 with parameter FH set on **76 (G 20)** the correspondent maximum input will be of **50 kW.**



3.26 - ADAPTATION FOR THE USE OF OTHER GASES

The boilers are specifically produced for the type of gas requested at the ordination phase.

DANGER!
The transformation of the boiler for the operation with a type of gas different than that specifically requested when the order has been placed, must be performed by professionally qualified personnel, in conformity to the norms and rules in force.
The manufacturer cannot be considered responsible for any damages consequential to the transformation not correct or not performed in conformity with the norms in force or instructions given by the manufacturer.

ATTENTION!
After having performed the transformation for the operation of the boiler with a type of gas, different (e.g. gas propane) than that specifically requested at the order stage. the appliance can work only with such new type of gas.

ATTENTION!
Indications for appliances working on Propane
Be sure that, before the installation of boiler, the reservoir of Propane has been bleeded.
For a correct bleeding of the reservoir revert to supplier of the gas and, however, to trained personnel.
If the reservoir has not been properly bleeded lighting problems can rise.
In such a case revert your self to the supplier of the reservoir.
For the conversion of the boiler from a gas to an other one it is necessary to proceed as follows:

1. Remove the front casing

2. Set the maximum pressure adjusting screw (A.) at approximately half range and screw of a turn the minimum pressure adjusting screw (B), as shown on page 50.

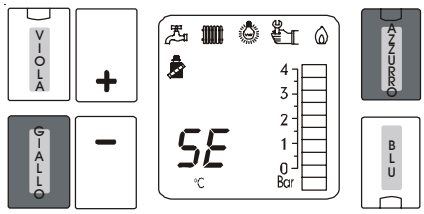
3. Try to ignite the boiler: if it fails proceed unscrewing of a turn the maximum pressure adjusting screw (A) and retry the ignition. Repeat more times the operation, till the ignition of the boiler.

4. Adjust the CO_2 value according to the type of gas as described in the paragraph "3.24 - Adjustment of the burner."

3.27 - PROGRAMMING OF THE OPERATING PARAMETERS

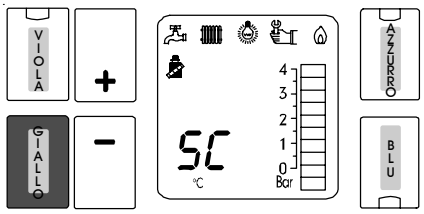
WARNING! THESE OPERATIONS ARE ACCESSIBLE TO TRAINED INSTALLERS AND SERVICE ENGINEERS ONLY FOR CHANGING THE PARAMETER SETTINGS

Press the YELLOW key and the LIGHT BLUE key simultaneously to enter in the service mode SE and change the values of the pre-set operating parameters.

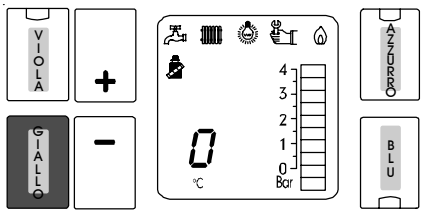


eBUS IDENTIFICATION CODE

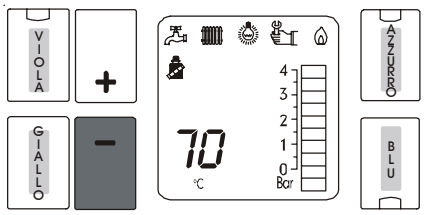
By pressing the YELLOW key you have access to the first adjustable parameter **eBUS IDENTIFICATION CODE (SC).**
Standard setting 0



(Operation A)
By pressing the YELLOW key again the standard parameter setting is displayed.

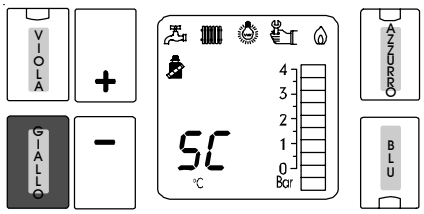


(Operation B)
By pressing the keys + (increase) or – (decrease) a number of times the parameter can be changed.



WARNING!
DO NOT CHANGE THE PARAMETER

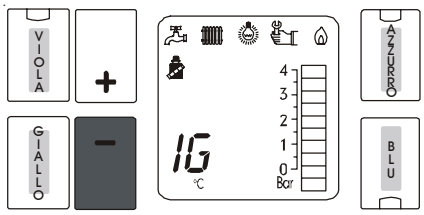
(Operation C)
After setting the desired value pressing the **YELLOW** key stores this new value in the memory.



BURNER MODULATION LEVEL IN IGNITION

Continue to change the parameters by pressing the – key (decrease).

The successive parameter which can be changed is: **BURNER MODULATION LEVEL IN IGNITION (IG)**

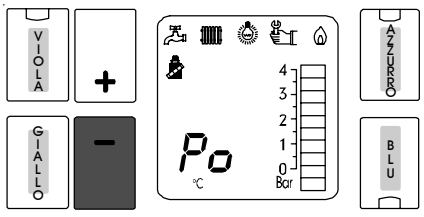


Repeat the operations A-B-C for setting the desired value from 0 to 99%.

	50 kW	70 kW
Standard Natural Gas setting	40 %	50 %
Standard LPG setting	45 %	60 %

PUMP OVERRUN

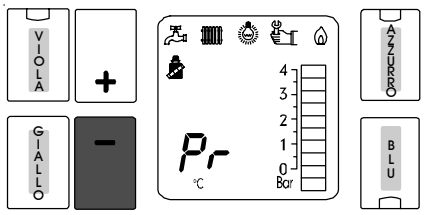
Continue to change to the parameters by pressing the – key (decrease).
The successive parameter which can be changed is: **PUMP OVERRUN (Po).**



Repeat the operations A-B-C for setting the desired value from 1 to 10 minutes.
Standard setting: 5 minutes

MODULATING PUMP MODULATING CAPACITY

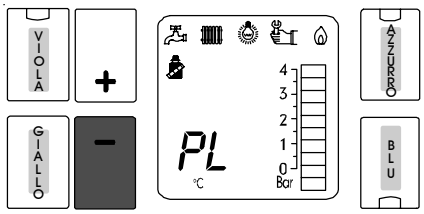
Continue to change the parameters by pressing the – key (decrease).
The successive parameter which can be changed is: **MODULATING PUMP MODULATING CAPACITY (Pr).**



Repeat the operations A-B-C for setting the desired value from 20 to 99%.
Standard setting: 99%

MODULATING PUMP MINIMUM MODULATION LEVEL

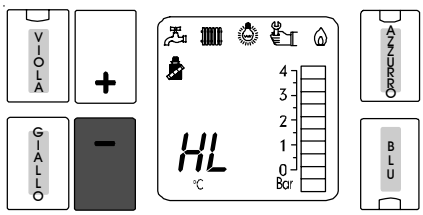
Continue to change to the parameters by pressing the – key (decrease).
The successive parameter which can be changed is: **MODULATING PUMP MINIMUM MODULATION LEVEL (PL).**



Repeat the operations A-B-C for setting the desired value from 0 to 99%.
Standard setting: **19 % per ALKON 50**
25 % per ALKON 70

SETTING OF THE MINIMUM HEATING TEMPERATURE

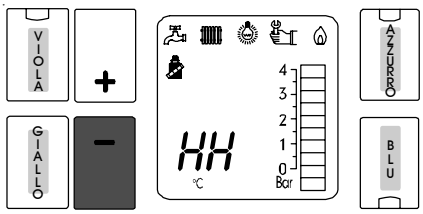
Continue to change to the parameters by pressing the – key (decrease).
The successive parameter which can be changed is: **SETTING OF THE MINIMUM HEATING TEMPERATURE (HL).**



Repeat the operations A-B-C for setting the desired value from 20 to 60°C
Standard setting: 35°C

SETTING OF THE MAXIMUM HEATING TEMPERATURE

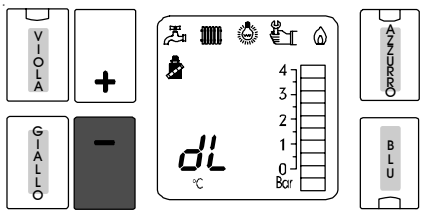
Continue to change to the parameters by pressing the – key (decrease).
The successive parameter which can be changed is: **SETTING OF THE MAXIMUM HEATING TEMPERATURE (HH**



Repeat the operations A-B-C for setting the desired value from 65 to 85°C
Standard setting: 80°C

SETTING OF THE MINIMUM DHW TEMPERATURE (only if combined with an external storage tank)

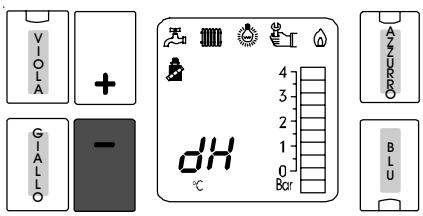
Continue to change to the parameters by pressing the – key (decrease).
The successive parameter which can be changed is: **SETTING OF THE MINIMUM DHW TEMPERATURE (dL).**



Repeat the operations A-B-C for setting the desired value from 35 to 45°C
Standard setting: 40°C

SETTING OF THE MAXIMUM DHW TEMPERATURE (only if combined with an external storage tank)

Continue to change to the parameters by pressing the – key (decrease).
The successive parameter which can be changed is: **SETTING OF THE MAXIMUM DHW TEMPERATURE (dH).**



Repeat the operations A-B-C for setting the desired value from 50 to 65°C
Standard setting: 60°C.

4 INSPECTION AND SERVICING SCHEDULE

To ensure the continued safe and efficient operation of the boiler it is highly recommended that it is checked at regular intervals and serviced when necessary, and that only original spare parts are used. Regular attention will prolong the life of the boiler.

If the boiler is not checked and serviced regularly it could cause material and personal damages.

For this reason UNICAL recommends that a servicing contract should be made with our authorized After Sales Service Assistance Centre.

The boiler must have regular maintenance and cleaning in order to ensure reliable and efficient operation. Regular attention will prolong the life of the boiler.

The frequency of servicing will be determined by the service engineer and will depend on the appliance's state of condition.

INSTRUCTIONS FOR INSPECTION AND SERVICING

To ensure a long life to all your boiler components and in order not to alter the conditions of the approved product, only original UNICAL spare parts must be used.

Before servicing always carry out the following steps:
- Disconnect the mains electricity supply.
- Separate the appliance from the electrical supply by means of a separating device with an opening contact of at least 3 mm (for example safety devices or power switches) and ensure yourself that it cannot be accidentally reinserted.
- Close the on-off valve fitted upstream of the boiler.
- If necessary, and in function of the type of work to be carried out, close any on-off valves fitted on the CH flow and return pipes, as well as the cold water inlet valve.
- Remove the appliance's front panel.

After having carried out all the necessary maintenance work always follow these steps:
- Open the CH flow and return valves as well as the cold inlet valve (if previously closed),
- Purge and, if necessary, proceed with restoring the heating system's pressure until a pressure of 0,8/1 bar is reached.
- Open the on-off gas cock.
- Reconnect the appliance to the electrical supply and switch on the mains electrical supply.
- Test for gas soundness, on the gas side and on the water side.
- Replace the appliance's front panel.

IMPORTANT:
After having performed the maintenance of the appliance remember to reset the counter by selecting "Cr" from the parameters menù and introducing the relevant resetting code.

TABLE OF RESISTANCE VALUES AS A FUNCTION OF THE HEATING SENSOR (SR) AND DHW (SS) TEMPERATURE SENSORS

T°C	0	1	2	3	4	5	6	7	8	9
0	32755	31137	29607	28161	26795	25502	24278	23121	22025	20987
10	20003	19072	18189	17351	16557	15803	15088	14410	13765	13153
20	12571	12019	11493	10994	10519	10067	9636	9227	8837	8466
30	8112	7775	7454	7147	6855	6577	6311	6057	5815	5584
40	5363	5152	4951	4758	4574	4398	4230	4069	3915	3768
50	3627	3491	3362	3238	3119	3006	2897	2792	2692	2596
60	2504	2415	2330	2249	2171	2096	2023	1954	1888	1824
70	1762	1703	1646	1592	1539	1488	1440	1393	1348	1304
80	1263	1222	1183	1146	1110	1075	1042	1010	979	949
90	920	892	865	839	814	790	766	744	722	701

Relationship between the temperature (°C) and the nominal resistance (Ohm) of the CH sensor and the DHW sensors.

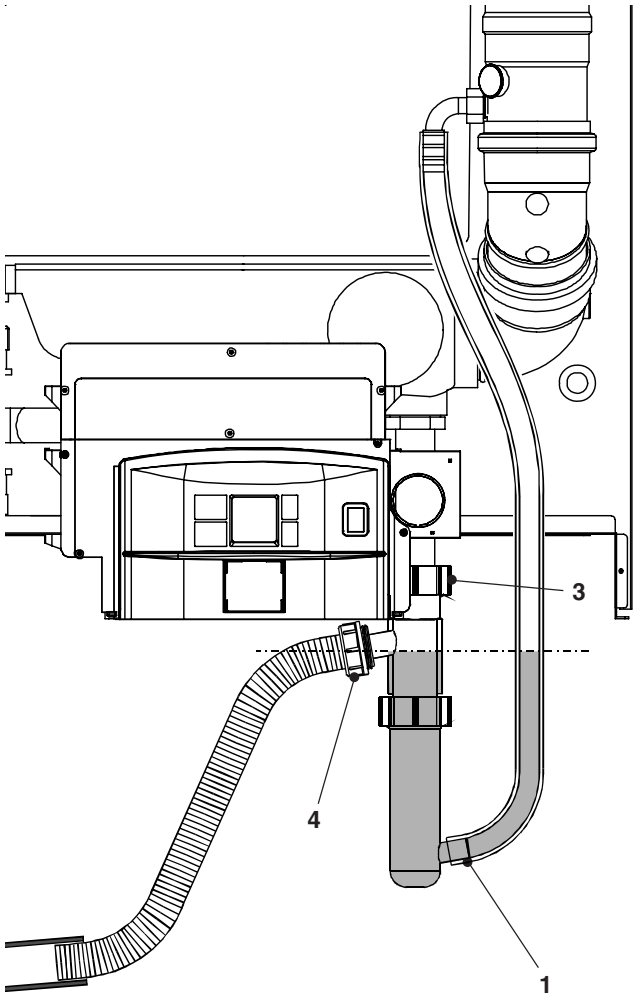
Example: At 25°C, the nominal resistance is 10067 Ohm
At 90°C, the nominal resistance is 920 Ohm

CLEANING THE CONDENSATE DRAIN SIPHON

In order to check and clean the siphon carry out the following steps:

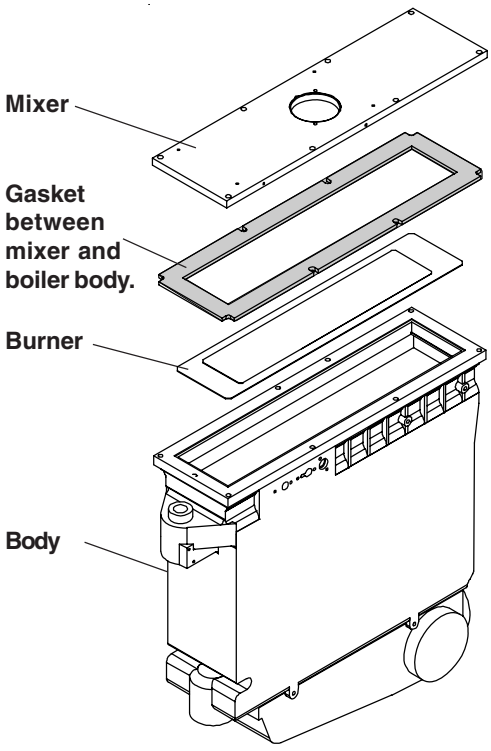
- disconnect the transparent pipe (1) check that no deposits have accumulated inside the siphon (2).
- unscrew the plastic nuts (3) and (4) and to remove the siphon;
- Verify if there are any deposits flush them out with clean water;
- reassemble the siphon in reverse order.

Danger!
Before commissioning the appliance fill the siphon via the filling hole and check the correct drainage of the condensate.
If the appliance is used with the condensate drain siphon empty, the combustion adjustments could result completely wrong. Furthermore this could lead to danger of intoxication following the escape of flue gasses.



SEALING GASKET BETWEEN DISTRIBUTOR AND BOILER BODY

DANGER!
It is absolutely necessary to replace the gasket at any time the inspection or maintenance is made on the burner.
When refitting the mixer tighten the nuts progressively and in crossed way, by using a dynamometric wrench adjusted at 10 Nm (1 kgm).



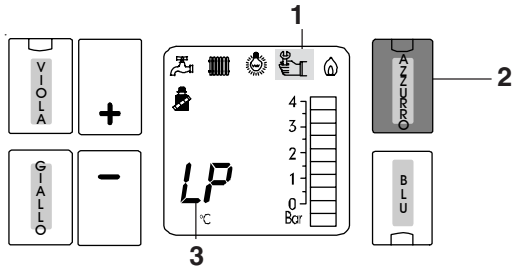
5 FAULT FINDING

5.1 - ERROR CODES

The boiler is fitted with an integrated diagnostic readout which, in case of malfunction, consents the immediate individuation of the type of fault directly on the control panel display

In the following fault finding table our purpose is to give some technical information regarding the solutions to any problems which could occur during boiler operation or commissioning of the boiler.

When the fault signalling led (1) is on, press the LIGHT BLUE key (2) to check the error code on the display (3).



Code:

PA

Description: Air in the pump (only for pump with Sensor Logic

Corrective action: Manually bleed the air from the circuit

Code:

db

Description: DHW sensor failure (only if the boiler is combined with an external storage tank)

Corrective action: Check the sensor's efficiency and/or its wiring

---

Code:

LL

Description: Mains voltage < 190 Vac

Corrective action: Check that the mains voltage is <190 Vac, if the mains voltage is correct replace the control board.

Code:

GP

Description: Insufficient gas pressure

Corrective action: Check the pressure; if the pressure is correct check the efficiency of the gas pressure switch and/or the wiring.

Code:

dt

Description: Difference between the heating temperature sensor (SR) and the heating return sensor (SRR) > 35°C.

Corrective action: Check the installation

Codice:

PJ

Description:
Jammed pump (only for pump with SensorLogic)

Corrective action:
After removal of the central plug of the pump body turn with a screw driver the pump rotor and replace the plug.

Code:

PC

Description:
Failure on the pump wiring (only for pump with SensorLogic)

Corrective action:
Verify the wiring

Code:

rb

Description: Failure of the heating return sensor (SRR)

Corrective action: Check the efficiency of the sensor and/or wiring

---

Codice:

LC

Description:
Insufficient water circulation

Corrective action:
Verify the installation

Code:

Ht

Description: Over high temperature detected by the heating sensor (SR) (>95°C)

Corrective action: Check the system's water circulation

Code:

LF

Description: Loss of flame signal during boiler operation

Corrective action: Press the reset key on the panel

Code:

Description: No flame detected during the ignition phase.

Corrective action: Press the reset key on the control panel

Code: FL

Description: Modulating fan failure

Corrective action: Check the fan's wiring

Code: FH

Description: Modulating fan failure

Corrective action: Check the fan's wiring

Code: LP

Description: Lack of water (only for pump equipped with SensorLogic)

Corrective action: Fill-up the water circuit

Code: Fr

Description: Main heat exchanger frozen

Corrective action: Carefully de-frost the exchanger

Code: HL

Description: Intervention of the high limit thermostat (TL)

Corrective action: Press the reset key on the control panel

Code: Hb

Description: Heating sensor failure

Corrective action: Check the sensor's efficiency and/or wiring

Code: FP

Description: Alteration of the operating parameters caused by EMC disturbances

Corrective action: Restore the factory parameters

Code: Fd

Description: Flame signal detected before the ignition cycle

Corrective action: Disconnect the detection electrode's wire from the control board; if the error code disappears replace the cable, otherwise replace the control board.

Code: GL

Description: Flame detected after burner OFF

Corrective action: Disconnect the gas valve's wire from the control board; if the error code disappears replace the control board, otherwise replace the gas valve.

Code: IF

Description: Internal failure

Corrective action: Replace the control board

5.2 - REQUEST OF MAINTENANCE

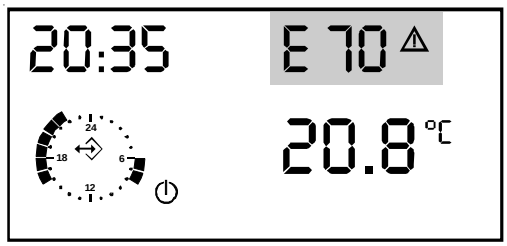
The boiler has an integrated system that, after 10.000 switching On or 2.000 hours of operation of the burner, provides to signal that the boiler needs maintenance.

Such information is indicated on the display by the lighting of the code Sr.

The flashing of the code doesn't inhibit the normal operation of the boiler.

Service the appliance and subsequently reset the counter by selecting "Cr" from the parameters menù and introducing the relevant resetting code.

5.3 - DISPLAY OF ERROR CODES ON HEATING CONTROLLER E8



In case of fault, on the display of the regulator a blinking triangle with its error code will appear

Here below you will find the E8 error codes, the relevant meaning and corrective actions.

For the error codes related to the heating system, make reference to the paragraph “Fault finding” of the “User Instruction manual” supplied with the E8.5064 heating controller.

Code:
E 41

Description:
Air in the pump (only for pump with Sensor Logic

Corrective action:
Manually bleed the air from the circuit

Code:
E 13

Description:
DHW sensor failure (SS) (only if the boiler is combined with an external D.H.W. tank)

Corrective action:
Check the sensor’s efficiency and/or its wiring

Code:
E 32

Description:
Mains supply < 190 Vac

Corrective action:
Check that the mains supply is < 190Vac. If the mains supply is correct replace the control board.

Code:
E 2

Description:
Insufficient gas pressure

Corrective action:
Check the pressure, if the pressure is correct control the gas switch and/or its wiring.

Code:
E 15

Description:
Difference between the temperature of the CH sensor (SR) and the temperature of the heating return sensor (SRR) > 35°C.

Corrective action:
Examine the system.

Code:
E 42

Description:
Jammed pump (only for pump with SensorLogic)

Corrective action:
After removal of the central plug of the pump body turn with a screw driver the pump rotor and replace the plug.

Codice:
E 43

Description:
Failure on the pump wiring (only for pump with SensorLogic)

Corrective action:
Verify the wiring

Code:
E 14

Description:
Failure of the heating return sensor (SRR)

Corrective action:
Check the efficiency of the sensor and/or its wiring

Code:
E 40

Description:
Bad water circulation

Corrective action:
Examine the system

Code:
E 6

Description:
Water temperature too high detected by the CH sensor (SR) (>95°C)

Corrective action:
Check adequate flow of water through boiler

Code:
E 5

Description:
Loss of flame signal during boiler operation

Corrective action:
Press the reset button on the control panel

Code:
E 4

Description:
No flame detected during the ignition phase

Corrective action:
Press the reset button on the control panel

Code:
E 24

Description:
Modulating fan failure

Corrective action:
Check the fan's wiring

Code:
E 26

Description:
Modulating fan failure

Corrective action:
Check the fan's wiring

Code:
E 8

Description:
Lack of water (only for pump with SensorLogic)

Corrective action:
Fill the hydraulic circuit

Code:
E 16

Description:
Main heat exchanger frozen

Corrective action:
Carefully de-frost the exchanger

Code:
E 1

Description:
Intervention of the overheat safety thermostat (TL)

Corrective action:
Press the reset key on the control panel

Code:
E 12

Description:
Fault at the heating flow sensor (SR)

Corrective action:
Corrective action: Check the efficiency of the sensor and/or its wiring

---

Code:
E 30

Description:
Alteration of the operating parameters caused by EMC disturbances

Corrective action:
Restore the factory parameters

Code:
E 11

Description:
Flame detected before the starting of the ignition cycle

Corrective action:
Disconnect the lead of the ionisation probe from the control PCB; if the error code disappears replace the lead,otherwise replace the control PCB.

Code:
E 20

Description:
Flame detected after burner extinction

Corrective action:
Disconnect the cable of the valve gas from the control PCB; if the error code disappears to replace the cable, otherwise replace the gas valve.

Code:
E 10

Description:
Internal fault

Corrective action:
Replace the Control PCB.

DICHIARAZIONE DI CONFORMITA' / *DECLARATION OF CONFORMITY*

Unical AG s.p.a

con sede / *with headquarters* in Castel d' Ario (MN) - via Roma, 123
in qualità di azienda costruttrice di caldaie a gas a condensazione / *as gas fired condensing boiler manufacturers*

DICHIARA / *DECLARE*

che tutti i modelli delle gamme / *that all the models of the ranges:*

ALKON 18 R - ALKON 24 R - ALKON 24 C - ALKON 28 C

ALKON 35 R - ALKON 35 C - ALKON 35S R - ALKON 35S C - ALKON 35S ELT

ALKON 50 (Questo modello viene commercializzato anche con potenza termica di 34,8 kW)

ALKON MASTER 50 - ALKON 70

ALKON CARGO 35 - ALKON CLIPPER 28

non appartengono a nessuna delle categorie dell'art.9 del Decreto Legislativo n. 93 del 25 febbraio 2000, in attuazione della direttiva 97/23/CE (in materia di attrezzature a pressione) e che tutti i modelli sopra citati sono completi di tutti gli organi di sicurezza e di controllo previsti dalle norme vigenti in materia e rispondono, per caratteristiche tecniche e funzionali, alle prescrizioni delle norme: */ do not belong to any of the categories specified in clause 9 of the European Directive 97/23/EC (regarding pressure equipment) and that all the a.m. models are fully equipped with all the safety and control instruments foreseen by the latest relevant regulations, and comply, with regards to the technical and operating characteristics, to the requirements stated in the following Standards and Directives:*

UNI EN 677	**Caldaie di riscaldamento centrale alimentate a combustibili gassosi. Requisiti specifici per caldaie a condensazione con portata termica nominale non maggiore di 70 kW /** *Gas-fired central heating boilers - Specific requirements for condensing boilers with a nominal heat input not exceeding 70 kW.*
UNI EN 483	**Caldaie per riscaldamento utilizzanti combustibile gassoso - Caldaie di tipo C con portata termica nominale non superiore a 70 kW /** *Gas-fired central heating boilers - Type C boilers of nominal heat input not exceeding 70 kW*
UNI EN 625 (Dove applicabile) *(Where's applicable)*	**Caldaie a gas per riscaldamento centrale - Prescrizioni specifiche per la funzione acqua calda sanitaria delle caldaie combinate con portata termica nominale non maggiore di 70 kW** */ Gas fired central heating boilers - Specific requirements for domestic hot water operation of combination boilers of nominal heat input not exceeding 70 kW.*
90/396/EEC	**Direttiva Gas** / *Gas Appliances Directive*
92/42/EEC	**Direttiva Rendimenti** / *Boiler Efficiency Directive*
2006/95/EC	**Direttiva Bassa Tensione** / *Low Voltage Directive*
2004/108/EC	**Direttiva Compatibilità Elettromagnetica** / Electromagnetic Compatibility Directive

Gli apparecchi sopra menzionati hanno ottenuto i requisiti di rendimento energetico corrispondente a 4 "Stelle", secondo la Direttiva Rendimenti 92/42/EEC, dall'Ente Omologante CERTIGAZ */ The a.m. appliances, with output up to 400 kW, have obtained the 4 stars efficiency classification, according to the Efficiency Directive 92/42/EEC, from the notified body CERTIGAZ.*

Sono inoltre marcate /
All these boiler ranges have the following

CE **PIN n° 1312BQ4306**

(IT) In attuazione del decreto ministeriale 18 febbraio 2007 e successive modifiche e integrazioni,attuativo della legge Finanziaria 2007 Gli apparecchi sopra menzionati hanno un rendimento termico utile,con carico pari al 100% della potenza utile nominale, maggiore o uguale a 93 + 2log Pn, (dove log Pn è il logaritmo in base 10 della potenza ulile nominale del singolo generatore, espressa in kW), come richiesto dal comma 1a dell'art. 9.

La Unical AG s.p.a. DECLINA ogni responsabilita' per sinistri a persone, animali o cose derivanti da manomissioni dell'apparecchio da parte di terzi non autorizzati, ovvero da un'errata installazione, od una manutenzione o riparazione carente o irregolare.
/ Unical declines any responsibility for injuries to persons, animals or to property deriving from wrong handling of the boiler by unauthorized third parties, or by bad installation or servicing.

Direttore Tecnico / Technical Manager
Dino Lanza

Unical AG s.p.a.

Castel d' Ario, 13 Gennaio / January 2009

Nota: E' possibile che alcuni prodotti descritti, non siano commercializzati.
Note: It is possible that some of the product indicated above will not be commercialised.

CERTIgaz

Certificat
Certificate

(Directives 90/396/CEE « Appareils à gaz » et 92/42/CEE « Rendement des chaudières »)
(« Gas appliances » 90/396/EEC and 92/42/EEC « Boilers efficiency « Directives)

Numéro : 1312BQ4306 (rév. 7)

CERTIGAZ, *après examen et vérifications, certifie que l'appareil :*
CERTIGAZ, after examination and verifications, certifies that the appliance :

- **Fabriqué par :**
  Manufactured by :
  UNICAL AG SpA
  Via Roma, 123
  I-46033 CASTEL D'ARIO (MN)

- **Marque commerciale et modèle(s) :**
  Trade mark and model(s) :
  UNICAL – ENEL.SI
  - **ALKON 70 - ALKON 50 – ALKON MASTER 50**
  - **ALKON 18 R – ALKON 24 R**
  - **ALKON 24 C – ALKON 28 C**
  - **ALKON 35 R – ALKON 35 C**
  - **ALKON 35S R – ALKON 35S C – ALKON 35S ELT**
  - **EK 280**
  - **ALKON CARGO 35 – ALKON CLIPPER 28**

- **Genre de l'appareil :**
  Kind of the appliance :
  CHAUDIERE A CONDENSATION
  CONDENSING BOILER
  (Types B23P, C13, C33, C43, C53, C63, C83, C13x, C33x, C43x, C63x, C83x)

- **Désignation du type :**
  Type designation :
  ALKON 50

Pays de destination *Destination countries*	**Pressions (mbar)** *Pressures (mbar)*	**Catégories** *Categories*
FR	**20/25 ; 37**	**II2Esi3P**
ES-GB-IE-IT-PT-GR-SE-NO	**20 ; 30/ 37**	**II2H3P**
DE	**20 ; 50**	**II2ELL3P**
HU	**25 ; 50**	**II2HS3P**
AT-CH-TR-HR-CZ-SK-SI	**20 ; 50**	**II2H3P**
LV-EE-LT	**20**	**I2E**
BE	**20/25**	**I2E(s)B**
BE	**37**	**I3P**
NL	**25 ; 30-50**	**II2L3P**
BG-CN-RU-RO	**20**	**I2H**
LU	**20 ; 50**	**II2E3P**
PL	**20 ; 13 ; 37**	**II2ELs3P**

est conforme aux exigences essentielles des directives « Appareils à gaz » 90/396/CEE et « Rendement des chaudières » 92/42/CEE
is in conformity with essential requirements of 90/396/EEC « Gas appliances » and 92/42/EEC « Boiler efficiency » directives.

CERTIGAZ
Le Directeur Général

Paris le : 30/09/2008

Yannick ONFROY
Rév. 7 : 1312BQ4306 du 2005/05/04

cofrac
CERTIFICATION DE PRODUITS INDUSTRIELS
Accréditation N°5-0042
Portée disponible sur www.cofrac.fr

CERTIgaz

Certificat
Certificate

PERFORMANCES ENERGETIQUES

ENERGY PERFORMANCE

Directive 92/42/CEE « Rendement des chaudières »)
92/42/EEC « Boilers efficiency » Directive

Annexe au certificat

Numéro : 1312BQ4306 (rév. 7)

- Fabricant :
Manufacturer :

UNICAL AG SpA
Via Roma, 123
46033 CASTEL D'ARIO (MN)

- Type de chaudière : **CHAUDIERE A CONDENSATION**
Type of boiler : *CONDENSING BOILER*
(Types B23P, C13, C33, C43, C53, C63, C83, C13x, C33x, C43x, C63x, C83x)

Marque commerciale et Modèle(s) *Trade mark and Model(s)*	**Label** *Label*
UNICAL – ENEL.SI ➢ **ALKON 70 – ALKON 50 – ALKON MASTER 50** ➢ **ALKON 18 R – ALKON 24 R** ➢ **ALKON 24 C – ALKON 28 R – ALKON 28 C** ➢ **ALKON 35 R – ALKON 35 C** ➢ **ALKON 35S R – ALKON 35S C – ALKON 35S ELT** ➢ **EK 280** ➢ **ALKON CARGO 35 – ALKON CLIPPER 28**	**4 ★**

Rév. 7 : 1312BQ4306 du 2005/05/04

Paris le : 30/09/2008

cofrac
CERTIFICATION DE PRODUITS INDUSTRIELS
Accréditation N°5-0042
Portée disponible sur www.cofrac.fr

Unical AG S.P.A.
46033 casteldario - mantova - italia - tel. 0376/57001 (r.a.) - fax 0376/660556
www.unical.ag - info@unical-ag.com

The Unical declines every responsibility for the possible inaccuracies if owed to errors of transcript or press. Also reserves the right to bring those changes that it will hold necessary to it own products or profits, without jeopardizing its essential characteristics.

CE